



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

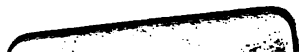
Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>





600004619Q

26.
279.





J.H. 1026

A
PRACTICAL SYSTEM
OF
MENTAL ARITHMETIC;

OR, A
New and Infallible Method of making Calculations

BY THE MERE
ACTION OF A THOUGHT,
WITHOUT PEN, INK, PENCIL, OR PAPER;

ILLUSTRATED
By numerous Examples and copious Notes;
Rendering every Part of the Work familiar to the weakest Mind.

TO WHICH IS SUBJOINED
AN INVALUABLE APPENDIX,

CONTAINING

- | | |
|--|--|
| <p>1. A very superior and easy Plan for bringing the various Currencies of America to Sterling, and Sterling to their Currencies, in one Minute. Extensively useful for Merchants.</p> <p>2. Excellent Rules, whereby the amount of any income, &c.; as also the Interest of any Sum of Money for any Time, and at any Rate per Cent. may be instantly ascertained.</p> <p>3. A new and particularly ingenious Plan, whereby the Day of the Month may be instantly ascertained till next Century. To which is added a pleasing Method of</p> | <p>finding, in one Minute, the Age of the Moon, and the Hours of the Moon's Rising and Setting at all Times, in every Year; as also Easter Day, Leap Year, &c., which will not only save the expence of purchasing Almanacs, for life, but unequivocally prove far superior to any Almanacs extant.</p> <p>4. Interesting Rules for finding the Year of the Cycle of the Moon; as also the Epact.</p> <p>5. A Plan for finding, in one Moment, the Time of High Water, for any Day, and for nearly every Place in the United Kingdoms.</p> |
|--|--|

The whole being admirably adapted for Merchants, & Dealers of every Description,

OR
FOR PRIVATE FAMILIES, AND PUBLIC SCHOOLS.

BY THE REV. JOHN WHITE,
MASTER OF CENTRE-HOUSE BOARDING-SCHOOL, RICHMOND GREEN,
SURREY,
Author of the Tutor's Expeditious Assistant,—The Expeditious Engraved Ciphering-Book, on a very superior System, to accompany the Assistant,—An Illustration to the New Discovery in Arithmetic, &c.

FIRST LONDON, FROM THE LAST AMERICAN EDITION;
STEREOTYPED AND GREATLY IMPROVED.

Before any thing is effected we think it impossible, but when it is done, we STARE, and wonder why it was not done before; the mind then receives it with a degree of affinity, as if it had been done before. BACON.

LONDON:

PRINTED FOR THE AUTHOR,
And may be had at his Academy, or sent to any part of the United Kingdom, in answer to letters, *post paid*, with a remittance, or note made payable in London.

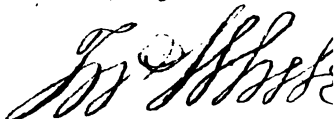
1836.

Price 3s. 6d. each.—12 for £1. 4s.—25 for £3. 8s., or £12. 12s. per 100.

Entered at Stationers'-Hall.

CAUTION.

TO PREVENT imposition by spurious copies being issued, a handsome Reward will be given to any person producing a Copy of this Work without the Author's Name, in his own Handwriting, at the back of the Title-page, as hereunder, to be paid immediately, on conviction of the parties so offending; and for the discovery of such offenders every possible means will be instantly used.

A handwritten signature in cursive script, likely belonging to J. M. Gowan, the publisher mentioned below.

Centre-House Boarding-School,
Richmond Green, Surrey.

J. M^r Gowan and Son, Great Windmill Street.

PREFACE.

If arts and sciences are to be valued in proportion to their utility and importance, a system of Mental Arithmetic will hold a very high place in the estimation of a commercial people.

Arithmetic, as generally taught in schools, is complicated, and too tedious ever to be introduced into a counting-house, or to be pursued by the man of business.

Every class of this most extensive part of society, have most frequently to calculate the value of goods at the moment, and perhaps at a time when neither pens, ink, pencil, or paper is at command, or time to use them; in this case a lad, though educated at one of the first finishing academies for commercial pursuits, would be totally incapable of making correct calculations, and even the most expert mathematician would, in this hurry of business, be frequently at a loss,—hence the necessity of this publication.

It will be seen, to the greatest admiration, that accounts which heretofore in almost every instance required much time and precision to adjust, are, by adhering to the rules in this work, to be performed with the greatest facility in one *second*, being solely the *labor* of a thought.

It is necessary to observe, however, that in a few in-

stances, though but very few, a little preparatory labour cannot be dispensed with,—a correct knowledge of the Enlarged Multiplication and Pence Tables, must be attained, which will be found in page 14 of this work; but in every case, when a knowledge of these is acquired, labour ceases, the desired object is attained, and practice only remains wanting to familiarize the plan; a short time, therefore, will be well occupied, if spent in the study thereof; but where the use of these tables is not wanted, *a child, though only slightly acquainted with the first four rules in arithmetic, by one day's instruction, which this work will enable his parent to afford, will be able to calculate the value of goods at any stipulated price, without pen, ink, pencil, paper, or book, with more ease and advantage than the most learned mathematician, by his usual plans.* The person, therefore, who for one day peruses this essay, will possess thereby a never-failing resource in his own mind, which will unequivocally prove of infinitely more value than the best ready-reckoner in the universe; and the person acquainted herewith, will ever after consider himself in a far superior situation to that of the most accomplished accomptant, who can only calculate by means of his pen: it is therefore presumed that every person concerned in trade will deem this an invaluable treatise; the scholar, inasmuch as thereby he will be inexpressibly relieved, and the illiterate man, insomuch as if he can only read, will be possessed of ability to attend to business with more ease and precision than the man who has been all his youth in study of the science, unacquainted herewith.

The whole of the work is comprehended in twelve Cases, including the rules of Direct and Inverse Proportion, commonly called the Rules of Three, in which important branch of Arithmetic, though rendered by the usual scholastic plans of performance too prolix

PREFACE.

v

ever to meet reception in the hurry of business, are performed, by this method, to the greatest admiration, by the mere action of a thought.

The work might have been rendered considerably more concise, a variety of extra cases, and a more than usually full explanation to every example having been given, with a view to afford the most explicit elucidation possible. The Author's aim throughout the work has been, rather to familiarize the subject to the weakest capacity, than to the confinement of his ideas to the rules of rhetoric, or the prevention of tautology; and on a perusal of the work, it is his greatest ambition to perceive, that in every particular he has become a child in expression, without being childish; and should it thereby become more serviceable to the unlearned, his purpose is answered:—the man of figures cannot prove less edified thereby, and he cannot but possess full confidence in the clemency of his brother in science.

To this illustration of Mental Arithmetic, an invaluable Appendix is subjoined; the first part of which contains a very superior Plan for bringing the various Currencies of America to Sterling, and Sterling to their Currencies, by a curious, easy, and far more speedy method than has ever heretofore been practised, **EXTENSIVELY USEFUL FOR MERCHANTS.** After which is given, a New and Useful Table, whereby the amount of any Income, Rates, Expenses, Salary, and Servants' Wage, for any number of months, weeks, or days, may be instantly ascertained, shewing at one view, what any sum, from *one pound to ten thousand*, per annum, is per calendar month, week, or day. From which table is also derived a curious, peculiarly easy, unerring, and very speedy method of finding the interest of *any* sum of money, for *any* number of months, weeks, or days, and at any rate per cent:

ADVERTISEMENT
TO
THE LONDON EDITION.

VERY large impressions of this work having been speedily disposed of in almost every part of the United States of America, and the Author having met with the highest commendations on the subject in every town in that country, where the work has appeared, it has been his anxious wish to prepare an edition suited also to the United Kingdom of Great Britain, which is now achieved, and cheerfully presented to the Public, with full confidence that the people of so enlightened a realm will no less appreciate its merits.

This Stereotyped Edition is still very considerably improved, and every possible care taken to avoid the smallest error: every sum has been performed several times, and the whole work rendered in every respect desirable to the community at large.

Should, however, notwithstanding every exertion, the transposition of a letter, or false figure escape, it is confidently hoped, that such error will prove *venia* by a generous Public.

J. WHITE.

January, 1826.

The following are but a few Copies of a great variety of Commendations with which the Author was favoured in the United States of America, from Men of the first standing in Society, and of the highest mathematical acquirements.

RECOMMENDATIONS TO
WHITE'S ARITHMETICAL PUBLICATIONS.

I have examined the Rev. Mr. White's Treatises upon Arithmetic, with attention, and consider them as highly meritorious, reflecting honour upon their author, and of incalculable advantage to society. Whoever abbreviates human labour in ascending the hill of science, and facilitates the acquisition of useful knowledge, merits public patronage, the good wishes of his fellow men, and is entitled to a conspicuous niche in the temple of fame.

By an acquaintance merely, with the illustrations on the four first rules, in the "Practical System of Mental Arithmetic," a child, by a single day's application and instruction, will learn to calculate, with mathematical precision, the value of goods at any stipulated price, without pen, ink, pencil, or paper. The utility, therefore, of these publications, to the mechanic, the farmer, the merchant, and teacher, is inexpressible, and, in my opinion, their merits only require to be known to be appreciated, and to ensure their introduction into all seminaries where the interests of society and the good of the rising generation are consulted.

WM. RAFFERTY, A. M.

Pastor of the Presbyterian Church, and Principal
of the Academy, Woodbury, New Jersey.

Woodbury,
2d Sept. 1818.

Philadelphia, Sept. 3, 1818.

Sir,—I have looked over your "Practical System of Mental Arithmetic," with the "Key and Appendix," together with the "Self-Instructor, or System of Practical Arithmetic," as applied to the first four rules of Arithmetic, and have great pleasure in assuring you, that I consider them to be invaluable publications. The correctness which is given to calculations—the facility with which it is performed—and the usual expenditure of time which is avoided by your mode of computation, must render them highly useful to all who have occasion to make use of Arithmetical progression.

JAMES ABERCROMBIE, D. D.

Principal of the Philadelphia Academy.

Rev. John White.

Philadelphia, Aug. 26, 1818.

Sir,—Having examined your “Mental Arithmetic,” and “Self-Instructor,” with their respective “Keys,” I feel it a duty I owe to you, as well as the public, to express my entire approbation of them. Believing that they will be highly beneficial to our youth, in giving them a knowledge of the power of figures, and a ready application of them to practical uses, and that teachers will be relieved to the greatest admiration.

You have, Sir, my sincere wish for their general adoption, both in schools and private families.

With sentiments of respect, I remain,

Yours, &c.

B. ALLISON, D. D.

Rev. J. White.

Chaplain to Congress.

Philadelphia, Sept. 2, 1818.

Rev. and Dear Sir,—I have, with attention, perused the “Self-Instructor,” “Mental Arithmetic, Key, and Appendix” thereto, and have no hesitation in declaring, that I am much pleased with them, and cheerfully recommend them to public patronage, hoping the laudable exertions of the author will meet their merited reward. Believe me, dear Sir,

Yours, &c.

SAMUEL B. WYLIE, D. D.

Rev. John White.

Principal of the Mathematical Academy.

“I have seen the Rev. Mr. White’s “Practical System of Mental Arithmetic,” together with his “Self-Instructor,” and a “Key to the Appendix,” and I have no hesitation to recommend them as containing a very superior system, and every way calculated to instruct youth, and incalculably useful to the teacher, merchant, and tradesman.

GILBERT ROBERTSON,

His Britannic Majesty’s Consul, for Philad.

Philadelphia,

Delaware, and W. Jersey.

Aug. 1, 1818.

I have looked over, with as much attention as I could secure, the Arithmetical publications of the Rev. Mr. White, and consider them in a high degree meritorious. They contain much ingenious and useful matter, and are calculated to excite in the pupil an early habit of thinking. The modes of performing operations are generally lucid, and, as far as I can judge, most of them are quite original.

WM. STAUGHTON, D. D.

President of the College at Washington,

Philadelphia, Aug. 4, 1818.

“The Self-Instructor is the same work, though considerably improved, which the Author now calls, “The Tutor’s Expeditious Assistant.”

TO THE READER.

THE reading of the Preface is most respectfully recommended to EVERY READER, prior to a perusal of the work; after which, the Author advises the Merchant or Tradesman, to examine *more* particularly the Cases and Rules which are most applicable to his peculiar dealings.

TO TEACHERS.

METHOD OF TEACHING THE MENTAL ARITHMETIC IN SCHOOLS, RESPECTFULLY SUBMITTED TO TEACHERS.

LET every Case and Rule be well studied, as also every Example, with their illustrations, from page 15 to page 81, inclusive, and then let the pupil proceed to the Miscellaneous Questions, from page 32 to page 40, and be particular in repeating every Example laid down, with each Case and Rule on which the Example is founded, and as there regularly referred to.

The Teacher is then strictly advised to request an explanation to every alternate Example, *in words of their own framing*, and so of the mental performances of the Rule of Three.

The Reduction of the various Currencies ought, for practice, to be performed by figures, as well as mentally.

CONTENTS.

	PAGE
ENLARGED Multiplication and Pence Tables, ...	14
To find the value of goods per dozen, at any price,	15 to 16
- - the value of goods per gross, (144), or when the quantity is any other multiple of 12, and at any price, ...	16 — 17
- - the value of goods at any price, when the quantity is nearly the multiple of 12, and when the fraction of a yard, lb., &c. is connected therewith, ...	17 — 18
- - the value of goods per score, or when the quantity is any multiple of 20, and at any price each, ...	18 — 21
- - the value of goods per 100, or any multiple of 100, at any price each, ...	21 — 22
- - the value of goods per cwt., (112 lb.), at any price, ...	22 — 24
- - the value of goods per hundred of six score, or when the quantity is 120, ...	24 — 25
- - the value per 1000, at any price per 100, ...	25 — 26
- - the value per chaldron, at any price per bushel, ...	26 — 27
- - the value per firkin, at any price per quart, ...	ib. — ib.
- - the value per barrel, at any price per gallon, ...	ib. — ib.
- - the value of goods to any promiscuous number of yards, pounds, &c., and at any price within the limits of the <i>Enlarged Tables</i> , ...	27
- - the value of goods to any promiscuous quantity, <i>however extensive</i> , by the mere action of a thought, ...	27 — 32
Miscellaneous questions, and answers, on all the preceding rules, ...	33 — 40
The Rule of Three performed <i>mentally</i> , ...	40 — 42
Miscellaneous questions on ditto, ...	43 — 46

APPENDIX.

To reduce the various Currencies of America to Sterling, and Sterling to their Currencies	47 — 53
--	---------

CONTENTS.

	PAGE
To reduce dollars to the currency of the various states of America, as also to bring the various currencies thereof to dollars	33 to 54
To ascertain the amount of any income, rates, expenses, salary, servants' wages, &c., to any amount, and for any number of weeks, months, or days, ...	55
To find the interest of any sum of money, for any number of months, weeks, or days, and at any rate per cent., ...	56 — 59
An ingenious plan, whereby the day of the month may be instantly ascertained, till the next century, (1900), ...	60 — 61
To find the age of the moon, ...	62 — 63
- - the hour of the moon's rising and setting, at all times, ...	63
- - when Easter-day will happen, for any year, ...	64
- - the year of the cycle of the moon, ...	65 — 66
- - the epact till 1900, ...	66 — 67
- - leap year, ...	67
- - the time of high-water for any day, and for nearly every place in the United Kingdom, ...	68

ENLARGED MULTIPLICATION TABLE.*

	13	14	15	16	17	18	19	20
2	26	28	30	32	34	36	38	40
3	39	42	45	48	51	54	57	60
4	52	56	60	64	68	72	76	80
5	65	70	75	80	85	90	95	100
6	78	84	90	96	102	108	114	120
7	91	98	105	112	119	126	133	140
8	104	112	120	128	136	144	152	160
9	117	126	135	144	153	162	171	180
10	130	140	150	160	170	180	190	200
11	143	154	165	176	187	198	209	220
12	156	168	180	192	204	216	228	240
13	169	182	195	208	221	234	247	260
14	182	196	210	224	238	252	266	280
15	195	210	225	240	255	270	285	300
16	208	224	240	256	272	288	304	320
17	221	238	255	272	289	306	323	340
18	234	252	270	288	306	324	342	360
19	247	266	285	304	323	342	361	380
20	260	280	300	320	340	360	380	400

ENLARGED PENCE TABLE.†

Pence.	£.	s.	d.	Pence.	£.	s.	d.	Pence.	£.	s.	d.
145 are	0	12	1	210 are	0	17	6	275 are	1	2	11
150	0	12	6	215	0	17	11	280	1	3	4
155	0	12	11	220	0	18	4	285	1	3	9
160	0	13	4	225	0	18	9	290	1	4	2
165	0	13	9	230	0	19	2	295	1	4	7
170	0	14	2	235	0	19	7	300	1	5	0
175	0	14	7	240	1	0	0	400	1	13	4
180	0	15	0	245	1	0	5	500	2	1	8
185	0	15	5	250	1	0	10	600	2	10	0
190	0	15	10	255	1	1	3	700	2	18	4
195	0	16	3	260	1	1	8	800	3	6	8
200	0	16	8	265	1	2	1	900	3	14	0
205	0	17	1	270	1	2	6	1000	4	3	4

* The practitioner of this system, having a correct knowledge of the Enlarged Multiplication Table, will imperceptibly become expert in dividing also any number within its limits, mentally; thus, as 16 times 19, are 304, the 16's in 304 are, therefore, easily known to be 19, and so of any other.

† If this Table be committed to memory, with very little practice, the value of any number within its limits may be instantly ascertained.

N.B. The insertion of the common arithmetical tables would be considered superfluous in this work, it being presumed the Reader of this essay has already acquainted himself therewith.

▲ **PRACTICAL SYSTEM** **OF** **MENTAL ARITHMETIC.**

OBSERVATION

The Author, in the following Illustrations, has laid down a variety of Cases, and several Rules, and Examples in each case, for the exercise of the mind, and to shew how variously, and with how much facility, by each plan, the most difficult question may be, mentally, performed; but in the 11th. Case has laid down ONE GENERAL and infallible method of finding the value of goods, to any PROMISCUOUS quantity whatever, and at any PRICE, however extensive, BY THE ACTION OF A THOUGHT.

CASE I.

To find the value of goods per dozen, or when the number of yards, pounds, &c. is 12, at any price each.

RULE.

1. If the price be in pence, the value will be just as many shillings per dozen, as pence each.
2. If the price be in shillings and pence, name the whole in pence, which will be the answer, in shillings, as before.
3. If farthings are connected, as pence are here considered shillings, farthings being parts of a penny, must be considered parts of a shilling.

Examples.

1. The value of 12 yards, at 2d. each, is 2s.

12	...	at	4d.	...	4s.
12	...	at	6d.	...	6s.
12	...	at	10d.	...	10s.

These, and all similar transactions, are to be performed by the mere action of a thought, having merely to call the number of pence so many shillings.

2. The value of goods per dozen, at 1s. 8d. each, I instantly ascertain to be 20s., merely by saying in my mind 1s. 8d. are 20d., and calling them shillings.

3. The value of 12 yards at 5s. 10d. per yard, I also ascertain in one moment to be 70s., or £3. 10s., merely by saying in my mind 5s. 10d. are 70d., and 70s. are £3. 10s.

I here name the 5s. 10d. in pence, because the value per dozen is ascertained by the number of pence each, and the cause is obvious:—12d. being a shilling, 12 at 70d. each, must amount to 70s., and so of any number of pence whatever.

4. The value of 12 yards at 3s. 3½d. per yard, is with equal facility in one moment known to be 39s. 6d., merely by saying in the mind 3s. 3d. are 39d., and half 12 is 6.

I here take half the 12, and call the quotient pence, because half a penny, reckoning a shilling for a penny, must be half 12d.

5. The value of 12 yards at 2s. 6¼d. each, is in a moment known to be 30s. 3d., or £1. 10s. 3d, by remembering that 30s. are £1. 10s., and that the fourth of a shilling is 3d.

In this example I say the fourth of a shilling, because a farthing is the fourth of a penny, and reckoning a penny a shilling, must be the fourth of a shilling, and I say 30s., because 2s. 6d. are 30d., which are called shillings.

6. The value of 12 cwt. at 12s. 10d. per cwt., is known by one thought to be 154s., or £7. 14s., by merely saying in the mind 12s. 10d. are 154d., and calling the pence shillings.

CASE II.

To find the value of goods per gross, or when the quantity of yards, lbs., &c., is any other multiple of 12, at any price.

RULE.

Consider the price of one dozen, as ascertained by the preceding rule, which sum multiply by the number of twelves contained in the question.

Examples.

1. The value of goods per gross, at 8d. each, I instantly know to be 96s. or £4. 16s., by merely saying in my mind 12 times 8 are 96.

The cause of this extremely speedy operation is at once strikingly obvious, by merely considering, as a gross is 12 dozen, and the price 8d. each, as in last rule, we call pence shillings, for one dozen, so the quantity in this example being 12 dozen, I multiply the 8d., called shillings, by 12, which make 96.

2. The value of 36 lbs., at 10d. per lb.. I instantly ascertain to be 30s., or £1. 10., by saying 3 tens are 30.

In this example I multiply the 10d. by 3, because 36 are 3 twelves.

3. The value of 96 yards, at 1s. 8d. per yard, I directly find to be 160s., or £8., by considering that 8 times 20 are 160.

I here say 8 times 20, because the quantity is 96, which are 8 twelves, and the price being 1s. 8d., which are 20d.

4. The value of 132 yards, at 2s. 6½d. per yard, I instantly ascertain to be 335s. 6d., or £16. 15s. 6d., by merely saying 11 thirties are 330, and 11 sixpences are 5s. 6d., which make £16. 15s. 6d.

Here I say 11 thirties, because 132 are 11 twelves, and 2s. 6d. are 30d., and the halfpenny, reckoning a shilling for a penny, being half a shilling, which is 6d., is the cause of adding 11 sixpences thereto.

5. The value of 4 dozen, at 3s. 4d. each, I know in a moment to be 160s., or £8., by saying 4 forties are 160.

Here I say 4 forties, because 4 dozen is the quantity, and 3s. 4d. are 40d.

CASE III.

To find the value of goods at any price, when the quantity is nearly the multiple of 12, and when the fraction of a yard, lb., &c., is connected therewith.

RULE.

1. Reckon in your mind, the quantity of goods; as though they consisted of an exact multiple of 12, as in the preceding rules, and subtract the difference therefrom, or add thereto, as the case may require.

2. If there are fractional parts in the quantity, take parts of the price, which add to the whole numbers.

Examples.

1. The value of $36\frac{1}{2}$ yards, at 1s. 8d. per yard, I instantly ascertain to be 60s. 10d., and of course £3. 0s. 10d., merely by saying 3 twenties are 60s., and half 20 is 10d.

In this example I say 60s. because 1s. 8d. are 20d., and 36 are 3 twelves; I also say half 20 is 10, because half a yard at 20d. must be half 20d.

2. The value of $12\frac{1}{2}$ yards, at 2s. 8d. per yard, I cannot fail knowing, in one moment, to be 32s. 8d., by calling the 32d. thirty-two shillings, and the fourth of 32, eight pence.

Here I say 32, because 2s. 8d. are 32d., which I call shillings, and add the fourth of 32, because a quarter of a yard at 2s. 8d. is the fourth of 32d.

3. The value of 35 yards, at 4d. per yard, I immediately discover to be 11s. 8d., merely by saying 3 times 4 are 12s., and deducting therefrom 4d.

Here I say 3 times 4, and deduct one therefrom, because 35 are 3 twelves excepting one.

4. The value of 39 yards, at 8d. per yard, I instantly know to be 26s. or £1. 6s., by saying 3 times 8d. are 24d., which I call 24 shillings, and 3 times 8d. are 2s., which, added together, are £1. 6s.

Here I add 3 times 8d. to the 24s., because 39 are 3 more than three twelves.

5. The value of 54 yards, at 11d. per yard, I know by one thought to be £2. 9s. 6d., because 4 times 11s. are 44s., and half 11s. are 5s. 6d., and, added together, 49s. 6d.

Here I add half 11s., because 54 are 4 twelves and a half.

6. The value of 85 yards, at 7d. per yard, is instantly known to be 49s. 7d., merely by saying, 7 times 7 are 49s., and adding 7d. thereto.

Here I multiply by 7, and add 7d., because 85 are 7 twelves, and 1 over.

CASE IV.

To find the value of goods per score, or when the quantity of yards, lbs., &c. is 20, or any multiple of 20, as 40, 60, 80, &c., and at any price each.

RULE 1.

1. If the quantity be 20, and the price in shillings, the value will be just as many £.'s per score, or for every 20 yards, &c., as shillings each.

2. If an aliquot part of a shilling be connected with the price, as 3d., 4d., 6d., &c., reckon in your mind as though it were the aliquot part of a pound.

Examples.

1. The value of 20 yards, at 2s. per yard, is £ 2.

20 ... at 4s. ... £ 4.

20 ... at 8s. ... £ 8.

20 ... at 12s. ... £12.

and so on to any amount, when the quantity is 20, by merely calling the number of shillings so many pounds.

2. The value of 20 yards, at 3s. 6d. per yard, I instantly ascertain to be £3. 10s., by merely calling the 3s. three pounds, and the 6d., which is half a shilling, half a pound.

3. The value of 20 yards, at 19s. 4d. per yard, is as instantly known to be £19. 6s. 8d., by calling the 19s. nineteen pounds, and saying the third of a pound is 6s. 8d.

I here say the third of a pound, because 4d. are the third of a shilling, and shillings are called pounds.

4. The value of a score at 17s. 1½d. each, I momentarily ascertain to be £17. 2s. 6d., by merely saying the eighth of a pound is 2s. 6d.

I here say the eighth of a pound, because 1½d. are the eighth of a shilling, and shillings are called pounds.

5. The value of 20 cwt., at 178s. 3d. per cwt., is with equal facility known to be £178. 5s., by merely saying the fourth of a pound is 5s., and calling the 178s. £178.

I here say the fourth of a pound, because 3d. is the fourth of a shilling, and shillings are called pounds.

RULE 2.

If the price be in pence, and not an aliquot part of a shilling, the value will be, as many shillings per score as pence each, added to eight times as many pence. If the enlarged tables are known, you have only to multiply the one by the other, in your mind.

Examples.

1. The value of 20 yards, at 7d. each, I in a moment ascertain to be 11s. 8d., by saying in my mind, 7 times 8d. are 56d. or 4s. 8d., and added to 7s., are 11s. 8d.

Here I say 7 times 8d., and add the product to 7s., because as 20 at 1d. each, would be 1s. 8d., so 20 at 7d. each, must be 7 times one shilling, and 7 times 8d.

N. B. If the enlarged tables are perfectly learnt, you may say in your mind, 7 times 20 are 140, and 140d. are 11s. 8d.

2. The value of 20 at 11d. each, I instantly ascertain to be 18s. 4d., by saying in my mind, 11 times 8d. are 88d., or 7s. 4d., and added to 11s., are 18s. 4d.

Here, as before, the cause of this operation is obvious; as 20 at 1d. each, would amount to 1s. 8d., so 20 at 11d. each, must amount to 11s., added to 11 times 8d.

RULE 3.

If the quantity be any multiple of 20, and the price each, in shillings, multiply the shillings by the number of twenties contained therein, and the product will be the value of the whole in pounds.

Examples.

1. The value of 40 yards, at 11s. per yard, without a moment's hesitation, I know to be £22., by merely saying twice 11 are 22.

I here say twice 11s. are 22s., and call them as many pounds, because 40 are two twenties; and as 20 at 11s. would amount to £11., so 40 at 11s. must amount to twice £11.

2. The value of 6 pieces of cloth, each containing 20 yards, at 12s. 6d. per yard, I know in one moment to be £75., merely by saying in my mind, 6 twelves are 72, and 6 half pounds are 3, and added together 75.

The cause of this speedy operation is very obvious, because, as per last rule, 20 at 12s. 6d. would be £12. 10s., calling the 6d., which is half a shilling, half a pound; 6 pieces, containing 20 yards each, must amount to 6 times £12., and 6 half pounds.

3. The value of 180 yards, at 11s. per yard, I ascertain, in an instant, to be £99., merely by remembering that 9 elevens are 99.

Here I say 9 times 11, because 180 are 9 twenties.

RULE 4.

1. If the quantity be 240, which are 12 twenties, the value of the whole will be as many pounds, as pence each.

2. If the quantity be an aliquot part of 240, as 120, 80, 60, &c., name the price in pence, which divide in your mind, by such aliquot parts, and the quotient will be the answer in pounds.

Examples.

1. The value of 240 at 8d. each, is £ 8.
 240 at 10d. ... £ 10.
 240 at 20d. ... £ 20.
 240 at 150d. ... £150.

and so on to any amount, when the quantity is 240, by merely calling the number of pence so many pounds.

The cause of this operation is very obvious; the quantity being 240, and 240d. being a pound, so 240 at 150d. each, must amount to £150., and so of any number of pence whatever.

2. The value of 240 barrels, at 2s. 11d. per barrel, I instantly know to be £35., merely by saying 2s. 11d. are 35d., and calling the pence pounds.

3. The value of 120 at 5s. 2d. each, I immediately know to be £31., by saying in my mind, 5s. 2d. are 62d., and half 62 is 31.

Here, as before, I call the pence pounds, which in this example are 62, and take half thereof, because 120 are half 240.

4. The value of 80 yards at 2s. 3d., is in a moment known to be £9., by saying the threes in 27 are 9.

I say here the threes in 27, because 80 are the third of 240, and 2s. 3d. are 27d., and so of any number of yards whatever, when such number is the aliquot part of 240.

CASE V.

To find the value of goods per 100, or any multiple of 100, at any price each.

RULE.

1. If the price be an aliquot part of a *shilling*, divide the quantity thereby, and the quotient will be the answer in *shillings*.

2. If the price be an aliquot part of a *pound*, divide the quantity thereby, and the quotient will be the answer in *pounds*.

3. If the price be *not* an aliquot part, consider as follows: viz.—The value per 100, will be 8 times as many shillings, and 4 times as many pence, as pence each.

Examples.

1. The value of 100 at 3d. each, I ascertain in a moment to be 25s., by saying the fours in 100 are 25

Here I say the fourth of 100, because 3d. is the fourth of a shilling, and the answer must consequently be in shillings.

2. The value of 400 yards, at 6d. per yard, is with equal facility ascertained in a moment to be £10., by saying the half of 400 is 200, and 200 shillings are £10.

Here I say the half of 400, because 6d. are half a shilling.

3. The value of 8 pieces, each containing 100 yards, at 2s. 6d. per yard, is as instantly discovered by saying, the eighth of £800. is £100., which is the amount.

Here I take the eighth of 800, because 8 pieces, each containing 100 yards, amount to 800 yards, and 2s. 6d. are the eighth of a pound, and the value of the whole is, consequently, ascertained in a moment to be £100.

4. The value of 100 barrels, at 5s. each, I ascertain to be £25. in a moment, merely by saying the fours in a 100 are 25.

Here I say the fours in 100, because 5s. are the fourth of a pound. The answer is consequently in pounds.

5. The value of 100 lb. at 7d. per lb., I speedily discover to be 58s. 4d., by saying 7 times 8s. are 56s., and 7 times 4d. are 28d., or 2s. 4d.; and, added together, 58s. 4d.

Here, though the price be not an aliquot part, I have merely to consider, as 100d. are 8s. 4d., 100 lbs. at 7d. per lb., must be 7 times 8s., and 7 times 4d.

CASE VI.

To find the value of goods per cwt., (of 112 lb.,) at any price each.

RULE.

1. If the price be an aliquot part of a shilling, take parts of the cwt., and the quotient will be the answer in shillings.

2. If the price be an aliquot part of a pound, take parts of the cwt., and the quotient will be the answer in pounds.

3. If the price be not an aliquot part, consider as follows, viz.—The value per cwt. will be nine times as many shillings, and four times as many pence, as pence each.

Examples.

1. The value per cwt., at 6d. per lb., I instantly discover to be 56s., or £2. 16s., merely by saying in my mind, half 112 is 56.

In this example I take half the cwt., which is 112, because 6d. are half a shilling, and consequently find the value of the whole in shillings.

2. The value of a cwt. at 3d. per lb., in one moment is known to be £1. 8s., because the fourth of a cwt. is 28, and 28s. are £1. 8s.

I here say the fourth of the cwt., because the price each is 3d., which are the fourth of a shilling.

3. The value of 112 lbs., at $1\frac{1}{2}$ d. per lb., I as speedily know to be 14s., by remembering that the eighth of 112 is 14.

Here I take the eighth, and call the quotient shillings, because $1\frac{1}{2}$ d. are the eighth of a shilling.

4. The value of 112 at 2s. 6d. each, I know to be £14., merely by saying the eighth of 112 is 14.

Here I take the eighth of 112, and call the quotient pounds, because 2s. 6d. are the eighth of a pound.

5. The value per cwt. at 10s. per lb., I know to be £56., because half 112 is 56.

I here halve the 112, and call the result pounds, because 10s. are half a pound.

6. The value of 112 lbs. at 7d. per lb., I speedily ascertain to be 65s. 4d., merely by saying in my mind, 7 times

9s. are 68s., and 7 times 4d. are 28d., or 2s. 4d., which, added together, are 65s. 4d.

Here, though the price be not an aliquot part, 112 lbs. being the quantity, and 7d. the price, I have only to consider, once for all, as 112d. are 9s. 4d., so the value of 112 lbs., at 7d. per lb., must be 7 times 9s. and 7 times 4d., and so of every similar example.

CASE VII.

To find the value of goods per hundred of six score, or when the quantity of yards, &c. is 120.

RULE.

1. If the price be in pence, half the number of pence each, will be the value in pounds, per hundred of six score.
2. If the price consist of shillings and pence, name the whole in pence, and proceed in the same manner.
3. If farthings are connected with the price, take parts of the six score, and call them pence.

Examples.

1. The value of 6 score at 8d. each, I ascertain in one moment to be £4. merely by saying half 8 is 4.

240d. being a pound, I readily perceive, as 6 score are 120, and 120 are half 240, that one half the price in pence, is the value per hundred of 6 score in pounds. So here, the price being 8d. each, the value of the whole must be half 8, which I call pounds.

2. The value of 120 yards at 10d. per yard, I as easily, by the action of a thought, ascertain to be £5., because half 10 is 5.

3. The value of 120 lbs., at 2s. 8d. per lb., I know to be £16., by recollecting that half 32 is 16.

In this example, I say half 32, because 2s. 8d. are 32d.

4. The value of 120 at 10s. 4d. each, I find to be, as instantaneously, £62., by saying half 124 is 62.

Here I say half 124, because 10s. 4d. are 124d.

5. The value of 120 yards, at 5s. 4½d. per yard, I as instantly discover to be £32. 5s., by saying in my mind, half £64. are £32., and half 120d. are 60d., or 5s.

In this example I say half 64, because 5s. 4d. are 64d., which I call pounds; and, as 120 at half a penny each are 120 halfpence, I take half the 120, which is 60, and call them pence.

6. The value of 120 at 8s. 4½d. each, I as readily perceive to be £50. 2s. 6d., by merely saying in my mind, half a hundred is 50, which I call pounds, and the fourth of 120 is 30, which I call pence, or 2s. 6d.

In this example I take half a hundred, because 8s. 4d. are 100d., and the fourth of 120, because 120 at a farthing each, are the fourth of 120 in pence.

7. The value of 120 ounces, at 7s. 6d. per oz., in a moment is ascertained to be £45., only by saying half 90 are 45.

Here I say half 90, because 7s. 6d. are 90d.

CASE VIII.

To find the value per 1000, at any price per 100, as tiles, bricks, boards, &c.

• RULE.

1. If the price be in shillings, half the number of shillings per 100 will be the value per 1000 in pounds.

2. If the price per 100 be in pence, annex a cipher, and you have at once, the price per 1000.

Examples.

1. The value per 1000 feet of joist, at 16s. per 100, is in one moment known to be £8., by merely saying half 16 is 8.

I consider as 10s. are half a pound, so half the price per 100, in shillings, must be the value per 1000 in pounds, because 1000 are ten hundred, and 10s. are half a pound; so in this example, the price being 16s. per 100, I take half the 16s., which is evidently the price per 1000 in pounds.

2. The value per 1000, at 36s. 4d. per 100, I instantly ascertain to be £18. 3s. 4d., by merely saying in my mind, half 36 is 18, and 40d. are 3s. 4d.

Here I take half the 36s., and call the result pounds, for the reasons assigned in last example; and I call the 4d. 40d., because 1000 are 10 times 100, and 40 are ten times 4, or 4 with a cipher annexed.

3. The value per 1000 at £2. 10s. 3d. per 100, I as easily ascertain to be £25. 2s. 6d., by saying in my mind, half 50 is 25, and 30d. are 2s. 6d.

In this example I take half 50, because £2. 10s. are 50s., and call the result pounds, as per rule; and I say 30d., because I annex a cipher to the 3d., by which it becomes 30d., or 2s. 6d., as explained in last example.

CASE IX.

1. To find the value per chaldron, at any price per bushel.
2. the value per firkin, at any price per quart, and
3. the value per barrel, at any price per gallon, by the action of a thought.

RULE.

Three times the number of pence per bushel, will be the value per chaldron, in shillings, and so of quarts, per firkin, and gallons per barrel.

Examples.

1. The value of coals per chaldron, at 20d. per bushel, I instantly know to be 60s., by merely saying in my mind 3 twenties are 60s.

This speedy method is discoverable by merely recollecting, as 12d. make 1s., and 3 times 12 are 36, which is the exact number of bushels in a chaldron, so coals at pence per bushel, must be 3 times the number of shillings per chaldron as pence per bushel; so I here say 3 times 20d. are 60d., which I call shillings.

2. The value of beer per firkin, at 10d. per quart, I instantly know to be 30s., or £1. 10s., by saying 3 times 10 are 30.

36 quarts being a firkin, I work this example exactly as the last, where 36 bushels are a chaldron, and say therefore, 3 times 10d. are 30d., which I call shillings.

3. The value per barrel, at 18d. per gallon, I as readily discover to be 54s., or £2. 14s., only by saying 3 times 18 are 54.

The speedy method of solving this problem, arises from the same causes as the two last examples, 36 gallons being one barrel.

4. The value per barrel, at 2s. 6d. per gallon, I perceive to be £4. 10s., by just saying 3 times 30 are 90, and 90s. are £4 10s.

Here I say 30, because 2s. 6d. are 30d., and 3 times 30, for the causes assigned in the first example of this rule.

CASE X.

To find the value of goods to any promiscuous number of yards, lbs., &c., and at any price, within the limits of the enlarged multiplication and pence and shilling tables. :

RULE.

Multiply in your mind, the price by the quantity, which is performed by the action of a thought, when the enlarged tables are known.

Examples.

1. The value of 15 yards, at 15s. per yard, I instantly ascertain to be £11. 5s., by saying in my mind, 15 times 15 are 225, and 225s. are £11. 5s.,

2. The value of 17 lbs. at 18d. per lb., in one moment is also known to be £1. 5s. 6d., by merely recollecting that 17 times 18 are 306, and that 306d. are £1. 5s. 6d.

These, and all similar operations, are performed with the greatest facility, by merely ascertaining the enlarged tables, which are easily acquired, and when learnt, are of incalculable utility.

CASE XI.

To find the value of goods to ANY promiscuous quantity, however extensive, by a moment's action of the mind.

RULE 1.

If the price be in shillings, and either the quantity or price an even number, as 4, 12, 16, &c. multiply the others in your mind, by half the even number, doubling the first figure for shillings, and the rest will be pounds; if both be an odd number, multiply, as directed in the last case.

Examples.

1. The value of 41 yards, at 18s. per yard, I instantly ascertain to be £36. 18s., by saying in my mind, 9 times 2 are 18, and 9 times 4 are 36.

In this example I take half the 18s., which is the price, and call the odd one in the number of yards 2, saying 9 times 2 are 18, which I call shillings, and multiply the 4 for pounds, saying 9 times 4 are 36, and the answer is instantly known to be £36. 18s.

N. B. This is equivalent to multiplying the 41 by 18, and then dividing by 20, to bring it into pounds, which is the old scholastic way of performing such problems. Inasmuch as I double the first figure, the original value is retained for the shillings, as if cut off with the cipher of the 20, and then divided by 2, as under, which is the usual method.

$$\begin{array}{r}
 \text{Multiply 41} \\
 \text{by 18} \\
 \hline
 2,0)73,8 \text{ Product.} \\
 \hline
 \underline{\underline{\pounds 36,18}}
 \end{array}$$

2. The value of 16 cwt., at £3 11s. per cwt., I as instantly know to be £56. 16s., by saying in my mind, 8 times 2 are 16, and 8 times 7 are 56.

In this example I have merely to recollect that £3. 11s. are 71s., for though the price I perceive to be an odd number, the quantity is an even number; I therefore consider as 16 cwt., at 71s. per cwt., would be exactly the same value as 71 cwt. at 16s. per cwt., so by reversing the operation in my mind, and proceeding as in the former example, the answer cannot fail in being equally correct.*

RULE 2.

1. If the price consists of shillings and pence, and the

* This rule affords a facility in calculations to any extent, and enables the accomptant to solve any question of magnitude, of this nature, in a moment, and not one transaction in fifty occurs, but either the quantity or price is an even number.

pence be an aliquot part of a shilling, as 2d., 3d., 4d. &c., or pence and farthings, as $\frac{1}{2}$ d., $1\frac{1}{2}$ d., &c., as many shillings as in the price added to the quotient of the quantity, divided by such aliquot part, will bring the answer in shillings, which reduce to pounds, as before directed.

2. If the price be an aliquot part of a pound, divide the quantity by such aliquot part, and the quotient will be the answer in pounds.

Examples.

1. The value of 32 yards, at 4s. $1\frac{1}{2}$ d. per yard, I instantly know to be £6. 12s., merely by saying in my mind twice 4 are 8s., and twice 3 are £6., to which I add the eighth of 32s., which is 4, and together £6. 12s.

This example is performed with equal facility, merely by multiplying in my mind, as per last rule, and adding thereto the value of 32 yards, at $1\frac{1}{2}$ d. per yard, which is, of course, instantly known to be the eighth part of a shilling, and therefore the eighth of 32, which I call shillings. I therefore say, twice 4, because 2 are half the 4s. in the price, and the first figure in the quantity, which is 2, I doubled in my mind for shillings, and then proceeded to multiply the remaining figure, which is 3, for pounds, and therefore say twice 3 are £6., and then add the eighth of the 32 for shillings, which make £6. 12s.

2. The value of 42 yards, at 6s. 8d. per yard, is in a moment known to be £14., by merely saying the threes in 42 are 14.

Here I say the threes in the quantity which is 42, because 6s. 8d. are the third of a pound, and perceive, consequently, at one thought, the quotient to be the answer in pounds.

RULE 3.

1. If the price be nearly one pound, and not an aliquot part, as 19s. 11d., or 19s. $11\frac{1}{2}$ d., &c., proceed in your mind as though the price were exactly a pound, and then subtract, as many farthings or pence deficient in the pound, as there are yards or articles in the quantity.

2. If the price be nearly one shilling, the same operation will bring the answer in shillings.

3. If the price be above a pound, or a shilling, add in your mind, in lieu of subtracting.

4. If the price be an aliquot part of a guinea, divide the quantity in your mind by such aliquot part, and the answer will be in guineas.

Examples.

1. The value of 21 yards, at 19s. 11½d. per yard, I in a moment know to be £20. 19s. 6¾d., merely by subtracting in my mind 21 farthings, which are 5¼d. from £21.

In this example it readily occurs to my mind, as 21 yards at 20s. per yard would be £21., (as per Case 4.) reckoning a pound for every yard that I have here, merely to subtract a farthing for every yard, from the price in pounds; the price here being a farthing per yard less than a pound.

2. The value of 31 yards, at 3s. 11½d. per yard, I instantly know to be £6. 2s. 8½d., by saying in my mind, twice 2 are 4s., and twice 3 are £6., from which I deduct 31 halfpence, or 1s. 3½d., which leave £6. 2s. 8½d.

In this question I consider that 3s. 11½d. are nearly 4s., and therefore proceed as in the last rule, by multiplying the quantity of yards, which are 31, by 2, which are half the 4s., doubling the first figure for shillings, and multiplying 3, the remaining figure, for pounds, which I find to produce £6. 4s.; from which I deduct 31 halfpence, which are 1s. 3½d. because 31 yards, at half a penny per yard, just amounts to half 31d.

3. The value of 81 yards at 8s. 1d. per yard, I instantly ascertain to be £32. 14s. 9d., by saying 4 times 2 are 8s. and 4 times 8 are £32, and added to 81d., which are 6s. 9d., make £32. 14s. 9d.

Here I multiply 81, which are the quantity of yards, by half the shillings in the price, doubling the first figure for shillings, as in the last example, saying 4 times 2 are 8, instead of 8 times 1 are 8, for the purpose of finding the rest in pounds, without any further work, saying 4 times 8 are £32. I then add 81d., because the number of yards is 81, and the price a penny per yard more than the 8s., which must amount to an addition of 81d., or 6s. 9d.

4. The value of 33 lbs. at 7s. per lb., in a moment I perceive to be £11. 11s., merely by saying the threes in 33 are 11, and 11 guineas are £11. 11s.

Here the price per lb. being 7s., I divide in my mind the quantity by 3, because 7s. are the third of a guinea, and finding 33 to

contain 11 threes, I ascertain the answer to be 11 guineas, and then say, 11 guineas are £11. 11s.

RULE 4.

1. If two or more articles are of different prices, but of an equal weight, or number of yards, add in your mind the prices together, and name the whole as one quantity.

2. If the quantities be different, and the price one, add the commodities together, which name as one commodity, at the price mentioned.*

Examples.

1. The value of half a cwt. of butter, at 19d. per lb., and half a cwt. at 11d. per lb., in one moment I ascertain to be £7., by merely saying the eights in 56 are 7.

Here the price of one article is at 19d., and the other at 11d., which reckoned in my mind, together, I find in a moment to be 30d., or 2s. 6d.; the prices being thus added, and the two commodities being equal in weight, they become one, and therefore I have only to say, 2s. 6d. being the eighth of a pound, and 56 lb. being half a cwt., the eights in 56 are 7.

2. The value of a piece of Irish cloth, containing 32 yards, at 2s. 9d. per yard, a piece of calico, containing the same quantity, at 1s. 3d. per yard, and 32 yards of cloth, at a shilling per yard, is altogether in a moment ascertained to be £8., merely by saying the fours in 32 are 8.

I here say the fours in 32, because the price of each, viz. 2s. 9d., 1s. 3d., and 1s., added in the mind together, I find to be 5s., which is the fourth of a pound.

3. The value of 78 lbs. of beef, at 8½d. per lb., and 78 lbs. of pork, at 15½d. per lb., I as speedily ascertain to be £7. 16s., only by multiplying the 78 by 1, and doubling the first figure for shillings, as per 1st. Rule in Case XI, page 27, saying, twice 8 are 16, which I call shillings, and the remaining 7 are pounds.

* The tradesman by adhering hereto in every transaction of this nature, will be relieved from considerable trouble, and frequently make an odd number even, in which case the answer presents itself to the mind.

I here multiply the 78 lbs. by 1, because $16\frac{1}{2}d.$ and $8\frac{1}{2}d.$ added together, as per Rule 1st. in this Case, are 2s., and 2s. being an even number, I take half thereof, and multiply the 78 thereby, *doubling* the first figure for shillings, calling the 8, 16, saying, once 16 is 16s., and once 7 is £7.

MISCELLANEOUS QUESTIONS

For Exercise on all the preceding Rules, with Answers, Proofs, and Illustrations,

FOR THE USE OF SCHOOLS AND PRIVATE FAMILIES.

Q. 1. *What is the value of gloves per dozen, at 2s. 3d. per pair?*

A. 27s.

Q. *How do you so readily ascertain this answer?*

A. By considering that 2s. 3d. are 27d., which I call shillings, as per 2nd. part of Rule in Case I, which says, (here repeat the 1st. Case, and 2nd. part of Rule, page 15).

Q. 2. *Inform me, by the same rule, what is the value of 12 yards of silk, at 11s. 2d. per yard?*

A. 134s., which are £6. 14s.

Q. *Explain how you ascertain this answer?*

A. (Here let the pupil say AUDIBLY, how this problem was performed MENTALLY, *without repeating the rule verbatim*, and so in every other case where the blanks are left to the letter A. for the answer, which is the case to every alternate question throughout the Miscellaneous Examples.)

Q. 3. *What is the value of 36 lbs. of beef at $7\frac{1}{2}d.$ per lb.?*

A. 22s. 6d., which are £1. 2s. 6d.

Q. *How is this ascertained?*

A. By considering that 36 are 3 twelves, and therefore saying in my mind, 3 times 7d. are 21d., which I call shillings, and then adding 3 sixpences thereto, for the three halfpence, which make 22s. 6d., as per Rule in Case II, which says, (here repeat the 2nd. Case and Rule, page 16).

Q. 4. *What is the value of 108 yards, at 11d. per yard?*

A. 99s., which are £4. 19s.

Q. *How was this ascertained?*

A.

Q. 5. *What is the value per hundred, of six score, at 7s. 4d. each?*

A. £44.

Q. *How do you so instantly solve this question?*

A. Merely by considering that 7s. 4d. are 88d., which I call pounds, and then saying half 88 is £44. as per 1st. and 2nd. part of Rule in Case VII., which says, (here repeat the 7th. Case, and the 1st. and 2nd. part of the Rule, page 24).

Q. 6. *Inform me, by the same rule, what is the value of 120 ounces of silver, at 8s. 4d. per ounce?*

A. £50.

Q. *How was this performed?*

A.

Q. 7. *If by the retail of goods I gain 7d. each, what are my profits per gross?*

A. 84s., which are £4. 4s.

Q. *How is a replication made so speedily to this problem?*

A. By merely saying in my mind, 12 times 7d. are 84d., which I call shillings, as per Rule in Case II, which says, (here repeat the 2nd. Case and Rule, page 16).

Q. 8. *Inform me, by the same rule, what is the value of 12 dozen pair of fowls, at 4s. 2d. per pair?*

A. 600s., which are £30.

Q. *How was this discovered so instantly?*

A.

Q. 9. *What must I pay per cwt. for copper at 2s. 6d. per lb.?*

A. £14.

Q. *How was this answer mentally discovered?*

A. By considering that 2s. 6d. are the 8th of a pound, and consequently saying in my mind, that the eighth of 112 is 14, which of course are pounds, as per 2nd. part of Rule in Case VI, which says, (here repeat the 6th. Case, page 22, and 2nd. part of Rule, page 23).

Q. 10. *Inform me, by the same rule, what would be the purchase per cwt. at 5s per lb.*

A. £23.

Q. How was this performed?

A.

Q. 11. Bought 12 cases of goods, each containing 100 pieces, at 6s. 8d. per piece, what is the value thereof?

A. £400.

Q. How did you obtain this answer?

A. By considering that 6s. 8d. being the third of a pound, the third of 1200, which are 400, must be the answer in pounds, as per 2nd. part of the Rule in Case VIII, which says, (here repeat the 5th. Case and 2nd. part of Rule, page 21 and 22).

Q. 12. What, by the same rule, will be the price of four pieces of Irish linen, each containing 30 yards, at 3s. 4d. per yard?

A. £20.

Q. Explain the method of this performance?

A.

Q. 13. Sold 48 yards of calico, at 1s. 8d. per yard, what is the charge thereof?

A. 80s., which are £4.

Q. How was this answer so instantaneously given?

A. Merely by considering as 48 are 4 twelves, and that 1s. 8d. are 20d., so 4 times 20d. must be the value in shillings, of 48 yards, as per Rule in Case II, which says, (here repeat the 2nd. Case and Rule, page 16).

Q. 14. Inform me, by the same rule, what will be the value of 132 yards, at 11d. per yard?

A. 121s., which are £6. 1s.

Q. Explain the method of this performance.

A.

Q. 15. What is the value of 31 yards of muslin at 18s. per yard?

A. £27. 18s.

Q. How did you ascertain this answer?

A. By saying in my mind, that 9 times 2s. are 18s., and then 9 times 3 are £27., which, added together, are £27. 18s., as per 1st. Rule in Case XI, which says, (here repeat the 11th. Case, and 1st. Rule, page 27).

Q. 16. Inform me, by the same rule, what is the value of 122 tons of old iron, at 16s. per ton?

A. £97. 12s.

Q. Explain the method of this performance?

A.

Q. 17. *Bought 72 yards of cloth, at 6s. 1d. per yard, what is the value thereof?*

A. £21. 18s.

Q. *How is this known?*

A. By taking half the 6s., and multiplying in my mind the 72 thereby, remembering to double the first figure for shillings, and that the rest will be pounds, saying, 3 times 4 are 12s. and 3 times 7 are £21., and, together, £21. 12s., to which I add 72d., which are 6s., for the odd penny, per yard, the problem being 72 yards, at 6s. 1d., as per 1st. Rule, and 3rd. part of the 3rd. Rule in Case XI, which says, (here repeat the 1st. Rule, page 27, and the 1st. three parts of the 3rd. Rule, page 29.)

Q. 18. *What, by the same rule, is the value of 20 yards at 12s. 2d. per yard?*

A. £12. 3s. 4d.

Q. *How was this question solved?*

A.

Q. 19. *What is the value of 33 pair of shoes, at 6s. 8d. per pair?*

A. £11.

Q. *How is this so speedily discovered?*

A. Merely by remembering that the threes in 33 are 11, which I call pounds, as per 2nd. part of the 2nd. Rule, Case XI, which says, (here repeat the 2nd. part of the 2nd. Rule in the 11th. Case, page 29.)

Q. 20. *What, by the same rule, must I pay for 72 yards of fine serge, at 3s. 4d. per yard?*

A. £12.

Q. *Explain the method of this performance?*

A.

Q. 21. *What is the value of 60 yards of satin, at 9s. per yard?*

A. £27.

Q. *How is this answer mentally obtained?*

A. By saying in my mind, 3 times 9s. are 27s., which I call pounds, as per 3rd. Rule, in Case IV, which says, (here repeat the 3rd. Rule, page 20).

Q. 22. *What, by the same rule, is the value of 140 yards of fine lace, at 12s. per yard?*

A. £84.

Q. How is this answer obtained?

A.

Q. 23. What must I pay for 100 at 3d. each?

A. 25s.

Q. How is this mentally performed?

A. Merely by saying in my mind the fours in 100 are 25, which I call shillings, as per 1st. part of Rule in Case V, which says, (here repeat the 5th. Case, and 1st. part of Rule, page 21).

Q. 24. What, by the same rule, is the value of 100 at 3½d. each?

A. 29s. 2d., which are £1. 9s. 2d.

Q. Explain the method of this mental performance.

A.

Q. 25. What are my profits per cwt., if I clear 2s. 6d. per lb.?

A. £14.

Q. How is this mentally performed?

A. By remembering that 2s. 6d. are the eighth of a pound, and that the eighth of 112, which is 14, must therefore be the answer in pounds, as per 2nd. part of Rule in Case VI., which says, (here repeat the 6th. Case, page 22, and 2nd. part of Rule, page 23).

Q. 26. What, by the same rule, is the value per cwt., at 5s. per lb.?

A. £28.

Q. Explain the method of performing this mentally?

A.

Q. 27. What must I pay per hundred of 6 score for mackerel, at 10d. each?

A. £5.

Q. How is this ascertained?

A. By saying in my mind, that half 10d. is 5d., and calling the pence so many pounds, as per 1st. part of Rule in Case VII, which says, (here repeat the 7th. Case, and 1st. part of Rule, page 24).

Q. 28. What, by the same rule, is the value of 120 lbs. of rice, at 8d. per lb.?

A. £4.

Q. Explain how this was ascertained?

A.

Q. 29. What is the value of coals per chaldron, at 18d. per bushel?

A. 54s., which are £2. 14s.

Q. How is this so speedily ascertained?

A. By remembering that 3 times 18d. are 54d., which I call shillings, as per Rule in Case IX, which says, (here repeat the 9th. Case and Rule, page 26).

Q. 30. What, by the same rule, must I pay, per barrel, for beer at 9d. per gallon?

A. 27s., which are £1. 7s.

Q. How was this answer so correctly given?

A.

Q. 31. What are my profits on goods per dozen, on which I clear 2s. 3d. each?

A. 27s., which are £1. 7s.

Q. How is this known by a mere thought?

A. Merely by calling to mind that 2s. 3d. are 27d., and calling the pence so many shillings, as per 2nd. part of Rule in Case I, which says, (here repeat the 1st. Case, and 2nd. part of Rule, page 15).

Q. 32. Inform me, by the same rule, what is the value of calf skins per dozen, at 3s. 4d. each?

A. 43s., which are £2. 3s.

Q. Explain the method of this mental performance?

A.

Q. 33. Sold 20 cwt. of cheese, at 54s. 6d. per cwt., what is my demand for the whole?

A. £54. 10s.

Q. How is this question solved?

A. Merely by naming the 54s. as so many pounds, and calling the 6d. which is half a shilling, half a pound, which being 10s., make £54. 10s., as per 1st. Rule in Case IV, which says, (here repeat the 4th. Case, page 18, and both parts of the 1st. Rule, page 19).

Q. 34. Inform me, by the same rule, what I must pay for goods, per score, at 3s. 6d. each?

A. £3. 10s.

Q. How is this ascertained mentally?

A.

of Rule, in Case VII, page 24); and for the half yard I add half 68d., which are 34d., or 2s. 10d., as per 2nd. part of Rule in Case III, which says, (here repeat the 2nd. part of Rule, page 17).

Q. 46. *Inform me, by the same rule, what I must pay for 120½ yards of Italian mantua, at 7s. 6d. per yard?*

A. £45. 3s. 9d.

Q. *Explain the method of solving this question?*

A.

Q. 47. *What would be the purchase of 660½ yards of mohair, at 6s. 8d. per yard?*

A. £220. 3s. 4d.

Q. *How is this so instantly discovered?*

A. By considering that 6s. 8d. are the third of a pound, and saying therefore in my mind, that one-third of 660 is 220, which are consequently so many pounds, as per 2nd. part of 2nd. Rule, Case XI, which says, (here repeat 2nd. part of 2nd. Rule, in the 11th Case, page 29), and for the half yard, I add half 6s. 8d., which are 3s. 4d.

Q. 48. *Inform me, by the same rule, what I must pay for 42½ yards of crape, at 3s. 4d. per yard?*

A. £7. 0s. 10d.

Q. *Explain the method of this mental performance?*

A.

CASE XII.

To perform Problems in the

RULE OF THREE, MENTALLY.

RULE.

If either term can be divided by the other, without leaving a remainder, do so, and work, in your mind, the remaining term by their quotient, and the answer will be immediately obtained.

Examples.

1. Supposing 4 yards to have cost £6. 1s., I instantly ascertain the value of 48 yards to be £72. 12s., by merely saying, 12 times 1 are 12, and 12 times 6 are 72.

Here I have merely to consider that 48 yards must cost 12 times as much as 4 yards, because 48 are 12 times 4 and therefore,

in this example, as 48 yards cost £6. 1s., I multiply in my mind the shillings by 12, saying, 12 times 1s. are 12s., and then the pounds, saying 12 times £6. are £72., and, together, £72. 12s.

2. Supposing 5 cwt. to have cost £12. 2s., I ascertain with equal facility the value of 40 cwt. to be £96. 16s., by merely saying 8 times 2 are 16, and 8 twelves are 96.

In this example, as 5 cwt. cost £12. 2s., I have merely to consider that 40 cwt. must cost 8 times £12. 2s., because 40 are 8 times as much again as 5.

3. Supposing 3 yards to have cost £7. 2s., in a moment I ascertain the value of 21 yards to be £49. 14s., by saying 7 times 2s. are 14s., and 7 times £7. are £49.

As 21 yards must cost 7 times as much as 3 yards, because 21 are 3 times 7, so I multiply in my mind the price of the 3 yards by 7.

4. Supposing for 72 yards I gave £64. 16s., I instantly discover the value of 8 yards to be £7. 4s., by merely saying in my mind, the nines in 64 are 7, and 1 over, which being 20s., I add to the 16s., saying the nines in 36 are 4.

If 72 yards be worth £64. 16s., eight yards can only be worth one-ninth part of £64. 16s., there being nine eights in 72. In this example I have therefore merely to divide the price in my mind by 9, and in a moment obtain the answer.

5. Supposing I give for 80 cwt. of old lead £16. 8s., I instantly know the value of 10 cwt. at the same rate to be £2. 1s., merely by saying in my mind the eights in 16 are two, and the eights in 8, are one.

Here I instantly conceive that 80 cost 8 times as much as 10 will cost, 80 being 8 times 10, and therefore divide, in my mind, the price of 80 by 8, and at once obtain the value of 10.

6. Having paid for 12 cwt. of cheese the sum of £84., I instantly know that 10 cwt. will cost £70., merely by saying in my mind 7 times 10 are 70.

In this example I perceive the second term divisible, equally by the first, and having already considered the consistency of so doing, have only to say, by the action of a thought, the twelves in 84 are 7, by which sum I multiply the 10, and the cause is strikingly obvious; for if 12 cwt. cost £84., of course, as in 84, there are 7 twelves, the price per cwt. must be £7., and consequently, the value of 10 cwt. is 10 times 7, which are £70.

7. Having purchased 4 yards of cloth, for which I gave 12s., I instantly know the value of 3 yards to be 9s., by merely saying 3 times 3 are 9.

As in this example, 4 yards are valued at 12s., I instantly see the propriety of dividing in my mind, the second term by the first, because if 4 yards cost 12s., as in 12 there are three 4's, so the value per yard I find to be 3s., and then cannot avoid recollecting, in one moment, that 3 yards must cost 3 times 3s.

8. Being charged for 36 gallons of wine the sum of £9., I readily perceive that 32 gallons, at the same rate, will cost £8., by merely saying in my mind the fours in 32 are 8.

As 36 gallons cost £9., I at once, recollecting that in 36 there are 4 nines, see the propriety of dividing the 32 by the 4, the price bearing exactly the same proportion.

9. If 40 yards cost £8., I instantly know 150 yards to be worth £30., by merely saying, the fives in 150 are 30.

I here say the fives in 150, because the number of eights in 40 are 5.

10. Supposing for 8 puncheons of wine I pay £40., I readily ascertain the purchase of 84 puncheons to be £420., by saying in my mind, 5 times 84 are 420.

I here say 5 times 84, because, as 8 puncheons cost £40., the value per puncheon must be £5., 40 being 5 times 8, and consequently the purchase of 84 puncheons, at £5. per puncheon, must be 5 times £84., which are £420.

11. If for 12 ounces of gold I paid £60., I readily know the price of 120 ounces to be £600., by saying 5 times 120 are 600.

I here say 5 times 120, because 12 ounces is the quantity bought, and £60. the price given; and the price per ounce being consequently £5., there being 5 twelves in £60., and of course the value of 120 ounces, at £5. per ounce, must amount to 5 times £120., which are £600.

12. If 32 yards of silk cost £8. 8s., I consider in a moment that the value of 4 yards must be £1. 1s., which is known by saying the eights in £8. are £1., and the eights in 8s. are 1s.

I here say the eights in £8. 8s., because, as 32 yards cost £8. 8s., 4 yards must cost the eighth of £8. 8s. which is £1. 1s. .

MISCELLANEOUS QUESTIONS

*For Exercise in the Rule of Three, with Answers,
Proofs, and Illustrations,*

FOR THE USE OF SCHOOLS AND PRIVATE FAMILIES.

Q. 1. *What is the value of 48 yards, supposing 6 yards to have cost £3. 10s.?*

A. £28.

Q. *How is this performed by the action of the mind?*

A. I have merely to consider that 48 yards must cost 8 times as much as 6 yards, because 8 times 6 are 48, and therefore multiply in my mind £3. 10s. by 8, saying 8 times 10s. are 80s., or £4., and 8 times £3. are £24., which, together, make £28.

Q. 2. *Inform me, by the same method, what I must pay for 72 yards supposing 12 yards to have cost £4. 2s.?*

A. £24. 12s.

Q. *Explain how this was mentally performed?*

A. (HERE LET THE PUPIL reply in a similar way to the illustration of the last problem, and so in every other Case where blanks are left to the letter A. for the answer, which is the case in every alternate example hereunder.)

Q. 3. *If 50 tons cost £80., what must I pay for 600 tons?*

A. £960.

Q. *How is this ascertained?*

A. As 600 are 12 fifties, 600 must cost 12 times as much as 50, I therefore ascertain this answer by saying, 12 times £80. are £960.

Q. 4. *Inform me, by the same rule, what I must pay for 48 yards, supposing 4 to have cost £10. 1s.?*

A. £120. 12s.

Q. *How was this mentally ascertained?*

A.

Q. 5. *Wishing $2\frac{1}{2}$ yards of the same cloth, of that for which I paid £10. for a piece containing 20 yards, inform me, by the action of a thought, what I must pay for that quantity?*

A. £5.

Q. *How is this answer so speedily found?*

A. As 20 yards cost £40., I can easily suppose that $2\frac{1}{2}$ yards are only worth the 8th. part of 40, which is 5, because $2\frac{1}{2}$ are the 8th. of 20.

Q. 6. *Inform me, by the same rule, what will be the charge of 8 yards, supposing 96 yards to have cost £36. 12s.?*

A. £3. 1s.

Q. *How was this so speedily discovered?*

A.

Q. 7. *If 72 yards cost £54. 18s., what must I pay for a further quantity, containing 8 yards?*

A. £6. 2s.

Q. *How is this ascertained?*

A. 8 being the ninth part of 72, I readily conceive that 8 yards can only cost the 9th. part of what 72 would cost, I therefore divide, in my mind, the value of the 72 yards, which is £54. 18s., by 9, saying, the nines in £54. are £6., and the nines in 18s. are 2s.

Q. 8. *Inform me, by the same rule, for what sum I can purchase 11 yards, supposing 132 to have cost £150. 12s.?*

A. £12. 11s.

Q. *Explain the method of this mental performance?*

A.

Q. 9. *If 8 puncheons of wine cost £40., what must I pay for 500 puncheons, at the same rate?*

A. £2500.

Q. *How is this solved, mentally?*

A. If 8 puncheons cost £40., I consider, of course, as the eights in 40 are 5, so the price per puncheon must be £5., and consequently the value of 500 puncheons is 5 times £500., which is momentarily known to be £2500., by saying, 5 times 5 are 25, and adding the two ciphers thereto.

Q. 10. *If 5 cwt. cost £25., I should wish to ascertain, by the same performance, what will be the charge of 61 cwt.?*

A. £305.

Q. How is this mentally performed?

A.

Q. 11. If 30 yards cost £5., what must I pay for 48 yards?

A. £8.

Q. How is this discoverable by the action of a thought?

A. As 30 yards cost £5., I, in a moment remembering that in 30 there are 6-fives, consider to obtain this answer, I have merely to divide in my mind the 48 by 6, and call the quotient pounds, because 30 yards, at £5., bears the same proportion as 5 yards at £30.

Q. 12. Inform me, by the same method, what I must pay for 49 barrels, supposing 28 to have cost £7.?

A. £12. 5s.

Q. Explain the method of this mental performance?

A.

Q. 13. If 9 cwt. cost £90., what must I pay for 12 cwt.?

A. £120.

Q. How is this ascertained?

A. As there are 10 nines in 90, I at once ascertain the value per cwt. to be £10., and consequently the value of 12 cwt. 12 times £10., which are £120.

Q. 14. Inform me, by the same rule, for what sum I can purchase 41 tons, supposing 6 to have cost £72.?

A. £492.

Q. Explain the method of this mental performance?

A.

Q. 15. If for 36 ounces of silver I pay £9., what will be the charge of 80 ounces?

A. £20.

Q. How is this answer attainable?

A. As in 36 there are 4 nines, I have merely to divide in my mind the 80 by 4, saying, the 4's in 80 are 20, which I call pounds, 36 ounces at £9. per ounce, being equivalent to 9 ounces at £36. per ounce.

Q. 16. Inform me, by the same rule, for what sum I can purchase 60 ounces, supposing 40 to have cost £10.?

A. £15.

Q. Explain the method of this mental performance?

A.

Q. 17. *What must I pay for 121 yards of Paduasoy, supposing for 11 yards I gave £6. 1s.?*

A. £66. 11s.

Q. *How is this performed by the action of the mind?*

A. By multiplying in my mind the £6. 1s. by 11, saying, 11 times 1s. are 11s., and 11 times £6. are £66., because 121, being 11 times 11; 121 yards must cost 11 times as much as 11 yards.

Q. 18. *Inform me, by the same rule, what I must pay for 96 gallons of palm sack, at the same rate of that for which I gave £5. 2s. for 8 gallons?*

A. £61. 4s.

Q. *How was this mentally performed?*

A.

Q. 19. *What must I pay for 6 yards of frieze, at the same price of that, 72 yards of which cost £24. 12s.?*

A. £2. 1s.

Q. *How was this problem so easily solved?*

A. Merely by saying in my mind, the twelves in £24. are £2., and the twelves in 12s. is 1s., and the cause is obvious, the value of 72 yards being 12 times as much as 6 yards, because 72 are 12 times 6.

Q. 20. *Inform me, by the same rule, what I must pay for 80 yards, supposing 10 to have cost £8. 2s.?*

A. £64. 16s.

Q. *How was this ascertained?*

A.

APPENDIX

TO

HITE'S MENTAL ARITHMETIC.

*uction of the various Currencies of America to
terling Money, and Sterling Money to their Cur-
ncies,*

BY THE ACTION OF A THOUGHT,
EXEMPLIFIED BY FIGURES.

CASE I.

o reduce the currency of Pennsylvania, Maryland, De-
re, New Jersey, and Ohio, to sterling, or to bring ster-
money into their currencies.*

RULE 1.

If the accounts be in pounds sterling, annex a cipher,
our mind, and divide by 6, and the quotient thereof
be in pounds Pennsylvania, and in the currency of
Jersey, Delaware, Maryland, and Ohio.

If the accounts be in shillings sterling, the same per-
formance will produce shillings in their currency. (Divide
2, and the answer will be in *pounds* currency.)

If in pence sterling, the like performance will pro-
pence in their currency.

Examples.

What sum in Pennsylvania currency is equal to £180.
ng ?

$\begin{array}{r} 6 \overline{) 1800} \\ \underline{000} \\ 1800 \end{array}$	Here I annex a cipher, and divide by 6, which is only the work of a thought, and the answer is obtained.
Ans. £. 300 cur.	

The currency of the states of New Jersey, Delaware, Mary-
and Ohio, are the same as in Pennsylvania.

2. What is the value of a bill of £326. sterling, in the currency of the states of Pennsylvania, New Jersey, Delaware, Maryland, and Ohio.

6)3260

Here I divide also by 6, but find there are £2. over; I therefore say, the £2. over, are 40s, and proceed as in common division, saying, the 6's in 40s. are 6s., and 4s. over, which are 48d., and the 6's in 48d. are 8d., which, together, are £543. 6s. 8d., and the value in the currencies required.

Ans. £. 543 6 8

3. What is the value in Pennsylvania currency, of £325. sterling?

Ans. £541. 13s. 4d. currency.

4. What is the value of a note of hand for £80. sterling, in the currencies of Pennsylvania, Ohio, and other states, where the dollar is 7s. 6d.

Ans. £133. 6s. 8d. currency.

RULE 2.

1. If the value be in pounds and shillings, add half the number of shillings to the pounds, in lieu of the cipher (as in the last rule,) and divide by 6, as in common arithmetic, and the quotient will be the value sought, in pounds and shillings of the currency of New Jersey, Pennsylvania, Ohio, Delaware, and Maryland.

2. If pence are connected with the pounds and shillings sterling, annex a cipher to the pence, and divide that by 6 also, and the result will be pounds, shillings, and pence, of the currencies thereof.

Examples.

1. Change £320. 8s. sterling into the currency of New Jersey, or Pennsylvania.

6)3204

Ans. £. 534 cur.

Here I take half the number of shillings, which in this example being 8, are 4; this I add to the pounds; and divide by 6, which brings the answer in pounds of the currency required, and why so, a glance of the last rule will discover. If to reduce shillings sterling to pounds of these currencies, I divide by 12, and to bring pounds sterling into pounds thereof, I annex a cipher, and divide by 6; so if shillings be with the pounds, 6 being one half of 12, I readily perceive, by placing half the number of shillings with the pounds, instead of annexing the cipher, I may still divide by 6, and obtain a correct answer.

2. Change £143. 2s. sterling, into Pennsylvania currency.

$\begin{array}{r} 6)1431 \\ \hline \text{Ans. } £. 238 \text{ } 10 \text{ cur.} \\ \hline \end{array}$	Here there are £3. over, I therefore call the £3., 60s., and say the 6's in 60 are 10, and call the 10, shillings, which brings the answer in pounds and shillings, Pennsylvania.
--	--

3. What is the value in Pennsylvania currency of a bill of exchange, for £60. 6s. 6d. sterling?

$\begin{array}{r} 6)603 \text{ } 60 \\ \hline \text{Ans. } £. 100 \text{ } 10 \text{ } 10 \text{ cur.} \\ \hline \end{array}$	With the pounds and shillings I proceed as explained in a note to the two last problems, and to the pence I place a cipher, and continue to divide by 6, as directed and exemplified in the first Rule of this Case, and the quotient is pounds, shillings, and pence, Pennsylvania currency.
---	--

4. With what sum ought a merchant in London to be charged, who is indebted to one of Philadelphia in the sum of £48. 6s. sterling? Ans. £80. 10s. currency.

5. What sum, in the currency of Maryland, will discharge a debt in England of £546. 12s. 6d.? Ans. £.911. 0s. 10d. currency.

RULE 3.

To reduce either pounds, shillings, pence, or farthings, in the currency of Pennsylvania, New Jersey, Delaware, Ohio, or Maryland, to sterling; examine the foregoing rules, and reverse their theorems.

Examples.

1. What is the value, in sterling money, of £300. in the currency of Ohio, New Jersey, Delaware, Maryland, or Philadelphia?

$\begin{array}{r} £. 300 \\ 6 \\ \hline \text{Ans. } £. 180,0 \\ \hline \end{array}$	By perusing the 1st. Example in the 1st. Rule, page 46, it will be seen, to bring pounds of these currencies to sterling, we annex a cipher, and divide by 6, so the reverse here; therefore, to reduce the above currencies to sterling, we multiply by 6, and cut off a cipher, which brings the answer £.180 sterling..
--	---

2. What is the value, in shillings sterling, of £14. Pennsylvania currency?

£. 14

12

The causes assigned for this performance, will be fully exemplified, by examining the second part of the 1st. Rule, page 46, and considering, as to bring shillings sterling to pounds Pennsylvania, we *divide* by 12, so to bring pounds Pennsylvania to shillings sterling, we *multiply* by 12.

Ans. 168s.

3. Change £238. 10s. of the currency of New Jersey, into sterling value.

£. 238 10

By annexing a cipher to the shillings sterling, and *dividing* by 6, the value in shillings of the currency of New Jersey, Pennsylvania, &c. is ascertained; so, by *multi-*

Ans. £. 143 2

plying shillings of their currency by 6, and cutting off the cipher, or first figure, for pence, the value in shillings sterling is obtained; in this example, I therefore say, 6 times 10 are 60, which I call 6, having cut off, in my mind, the cipher; I then double the first figure, in the pounds, for shillings, and therefore call the 8, 16; saying, 6 times 16 are 96, and the 6 to be carried for the 10s., make 102s., which is £5. 2s., I then set down 2s., and carry 5; saying, 6 times 23 are 138, and 5 I carry, make £143., which brings the answer, £143. 2s.

4. What is the value in London of a bill for £.534 Pennsylvania currency?

Ans. £320. 8s. sterling.

5. What is the charge, in sterling money, for tobacco, amounting to £600. in the currency of Maryland?

Ans. £360. sterling.

RULE 4.

1. To reduce the currency of the New England States,* Virginia, Kentucky, and Tennessee, to sterling; *subtract* one fourth of the value therefrom.

2. To bring sterling money to their currencies, *add* one third of the value thereto.

* The New England States are, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Examples.

1. What is the value in Vermont, Maine, Massachusetts, New Hampshire, Rhode Island, or Connecticut, of a quantity of good, amounting to £1200. sterling?

$$\begin{array}{r} 3)1200 \\ \underline{400} \end{array}$$

Here I have merely to divide by 3, and to add the product thereof thereto.

Ans. £. 1600 cur.

2. What is the sterling value of goods amounting to £1600. in the currency of the New England States, or Virginia in North America?

$$\begin{array}{r} 4)1600 \\ \underline{400} \end{array}$$

The performance of this example, on examination, will be found the reverse of the former.

Ans. £. 1200 sterl.

3. A merchant of Richmond, in Virginia, draws on a merchant of London for the amount of his share in a cargo of tobacco, being £346. 16s. currency, what will be the value of the acceptance in England?

Ans. £260. 2s. sterling.

4. A merchant lands goods on Rhode Island amounting to £640. sterling, what sum is his demand, in that currency?

Ans. £853. 6s. 8d. currency.

RULE 5.

1. To bring sterling money to the currency of New York and North Carolina, double the amount, and subtract one-ninth therefrom.

2. To bring the currency of New York and North Carolina to sterling, add one-eighth to half the amount.

Examples.

1. A gentleman of Raleigh, North Carolina, is indebted to a merchant in London £600. currency; what sum sterling is the merchant's demand?

$$\begin{array}{r} 8(300 \\ \underline{37\ 10} \end{array}$$

Here I have merely to divide half the amount in my mind, (which is 300) by 8, saying the 8's in £300. are 37, and £4. over, which are 80s., and the 8's in 80s. are 10s., which brings £37. 10s., and,

Ans. £. 337 10 sterl.

added to the £300., the answer £337. 10s.

2. What is the value of £450. sterling, in the currency of New York?

$\begin{array}{r} 9)900 \\ \underline{100} \end{array}$	In this question I have merely to say, twice 450 are 900; the 9's in 900 are 100, and to subtract the 100 therefrom, which gives the answer.
Ans. £. 800 cur.	

3. What is the value, in Newburn, North Carolina, of £78. sterling?

Ans. £188. 13s. 4d. currency.

4. What will be the charge, in sterling money, of cotton, sent to England, from North Carolina, amounting to £180. of that currency?

Ans. £101. 5s. sterling.

RULE 6.

1. To bring sterling money to the currency of South Carolina and Georgia, add one-twenty-seventh of the amount thereto.

2. To reduce the currency of South Carolina and Georgia to sterling, subtract one twenty-eighth of the amount therefrom.

Examples.

1. Change £325. 7s. sterling to the currency of South Carolina, or Georgia.

$\begin{array}{r} 27)325 \ 7 \\ \underline{12 \ 1} \end{array}$	Here I have only to say, the 27's in 325 are 12, and £.1 over, which, added to the 7s. are 27s., then the 27's in 27 is 1, which brings £12. 1s.; this I add to the amount, and obtain the answer £337. 8s.
Ans. £. 337 8 cur.	

2. A merchant in Charleston, South Carolina, exports to London a quantity of rice, which amounts to £337. 8s. currency, what is the charge thereof in sterling money?

$\begin{array}{r} 28)337 \ 8 \\ \underline{12 \ 1} \end{array}$	This question is exactly the reverse of the last, whereas therefore in the last, I added the 27th. of the amount thereto, so the reverse here; this, I divide by 28, and subtract such 28th. part therefrom.
Ans. £. 325 7 sterl.	

3. A merchant in Charleston, South Carolina, exports to London a quantity of rice, which amounts to £560. currency, what will be the charge thereof in sterling money?

Ans. £540. sterling.

4. A resident in Columbia, South Carolina, has a bill of £784. currency, to discount, what sum is the value thereof in England? Ans. £756. sterling.

RULE 7.

1. To bring sterling money to the currency of British America, *add* one-ninth of the amount thereto.

2. To reduce the currency of British America to sterling, *subtract* one-tenth therefrom.

Examples.

1. Change £873. sterling to the currency of the various British colonies in America.

$$\begin{array}{r} \text{£.} \\ 9)873 \\ 97 \\ \hline \end{array}$$

Ans. £.970 currency.

2. What sum sterling will discharge a bill of £970. of the currency of Halifax, Nova Scotia, St. John, New Brunswick, Quebec, Lower Canada, or Kingston in Upper Canada?

$$\begin{array}{r} \text{£.} \\ 10)970 \\ 97 \\ \hline \end{array}$$

Ans. £.873 sterling.

3. Change £486. sterling to the currency of the British settlements in America. Ans. £540. currency.

4. What sum sterling will discharge a bill of £941. in the currency of Canada, New Brunswick, Cape Breton, St. John, New Britain, and in the province of Nova Scotia?

Ans. £846. 18s. sterling.

CASE II.

To reduce dollars to the currency of the various states of America, as also to bring the various currencies thereof to dollars.

RULE.

1. To reduce dollars to pounds of the currency of Maryland, Delaware, New Jersey, Ohio, and Pennsylvania, multiply by 3, and divide by 8.

2. To reduce dollars to pounds of the currency of New York, and North Carolina, multiply by 5, and divide by 2.

3. To reduce dollars to pounds of the currency of South Carolina and Georgia, multiply by 30, and divide by 7.

4. To reduce dollars to pounds of the currency of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Virginia, Kentucky, and Tennessee, add a cipher, and divide by 3.

5. To reduce dollars to pounds of the currency of either Province, in British America, divide by 4.*

6. To bring either currencies to dollars, reverse their performances.

Reduce 144 dollars into the currency of Maryland, Delaware, New Jersey, Ohio, or Pennsylvania.

$$\begin{array}{r} \$ 144 \\ 3 \end{array}$$

$$\hline 8)432$$

$$\hline \text{Ans. } £ 54$$

Bring £54. of the currency of Ohio, Pennsylvania, and other states where the dollar is 7s. 6d. into dollars.

$$\begin{array}{r} £. 54 \\ 8 \end{array}$$

$$\hline 3)432$$

$$\hline \text{Ans. } \$ 144$$

N. B. The above examples are sufficient illustrations for all the various currencies, every other being performed in a similar way.

\$ stands for dollars.

* If shillings and pence are connected with pounds, bring the shillings to pence, and divide their number by as many pence as there are pence in a dollar, as it passes in each state.

A NEW AND USEFUL TABLE Whereby the Amount of any Income, Rates, Expenses, Salary, and Servants' Wages, for any Number of Months, Weeks, or Days, may be Instantly ascertained, shewing, at one View, what any Sum, from £1. to £10,000, per Annum is per Calendar Month, Week, or Day.														
Per Yr.			Per Month.			Per Week.			Per Day.			Per Yr.		
£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
1	10	0	1	10	0	1	10	0	1	10	0	1	10	0
2	0	0	2	0	0	2	0	0	2	0	0	2	0	0
2	10	0	2	10	0	2	10	0	2	10	0	2	10	0
3	0	0	3	0	0	3	0	0	3	0	0	3	0	0
3	10	0	3	10	0	3	10	0	3	10	0	3	10	0
4	0	0	4	0	0	4	0	0	4	0	0	4	0	0
4	10	0	4	10	0	4	10	0	4	10	0	4	10	0
5	0	0	5	0	0	5	0	0	5	0	0	5	0	0
5	10	0	5	10	0	5	10	0	5	10	0	5	10	0
6	0	0	6	0	0	6	0	0	6	0	0	6	0	0
6	10	0	6	10	0	6	10	0	6	10	0	6	10	0
7	0	0	7	0	0	7	0	0	7	0	0	7	0	0
7	10	0	7	10	0	7	10	0	7	10	0	7	10	0
8	0	0	8	0	0	8	0	0	8	0	0	8	0	0
8	10	0	8	10	0	8	10	0	8	10	0	8	10	0
9	0	0	9	0	0	9	0	0	9	0	0	9	0	0
9	10	0	9	10	0	9	10	0	9	10	0	9	10	0
10	0	0	10	0	0	10	0	0	10	0	0	10	0	0
10	10	0	10	10	0	10	10	0	10	10	0	10	10	0
11	0	0	11	0	0	11	0	0	11	0	0	11	0	0
11	10	0	11	10	0	11	10	0	11	10	0	11	10	0
12	0	0	12	0	0	12	0	0	12	0	0	12	0	0
12	10	0	12	10	0	12	10	0	12	10	0	12	10	0
13	0	0	13	0	0	13	0	0	13	0	0	13	0	0
13	10	0	13	10	0	13	10	0	13	10	0	13	10	0
14	0	0	14	0	0	14	0	0	14	0	0	14	0	0
14	10	0	14	10	0	14	10	0	14	10	0	14	10	0
15	0	0	15	0	0	15	0	0	15	0	0	15	0	0
15	10	0	15	10	0	15	10	0	15	10	0	15	10	0
16	0	0	16	0	0	16	0	0	16	0	0	16	0	0
16	10	0	16	10	0	16	10	0	16	10	0	16	10	0
17	0	0	17	0	0	17	0	0	17	0	0	17	0	0
17	10	0	17	10	0	17	10	0	17	10	0	17	10	0
18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
18	10	0	18	10	0	18	10	0	18	10	0	18	10	0
19	0	0	19	0	0	19	0	0	19	0	0	19	0	0
19	10	0	19	10	0	19	10	0	19	10	0	19	10	0
20	0	0	20	0	0	20	0	0	20	0	0	20	0	0
20	10	0	20	10	0	20	10	0	20	10	0	20	10	0
21	0	0	21	0	0	21	0	0	21	0	0	21	0	0
21	10	0	21	10	0	21	10	0	21	10	0	21	10	0
22	0	0	22	0	0	22	0	0	22	0	0	22	0	0
22	10	0	22	10	0	22	10	0	22	10	0	22	10	0
23	0	0	23	0	0	23	0	0	23	0	0	23	0	0
23	10	0	23	10	0	23	10	0	23	10	0	23	10	0
24	0	0	24	0	0	24	0	0	24	0	0	24	0	0
24	10	0	24	10	0	24	10	0	24	10	0	24	10	0
25	0	0	25	0	0	25	0	0	25	0	0	25	0	0
25	10	0	25	10	0	25	10	0	25	10	0	25	10	0
26	0	0	26	0	0	26	0	0	26	0	0	26	0	0
26	10	0	26	10	0	26	10	0	26	10	0	26	10	0
27	0	0	27	0	0	27	0	0	27	0	0	27	0	0
27	10	0	27	10	0	27	10	0	27	10	0	27	10	0
28	0	0	28	0	0	28	0	0	28	0	0	28	0	0
28	10	0	28	10	0	28	10	0	28	10	0	28	10	0
29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
29	10	0	29	10	0	29	10	0	29	10	0	29	10	0
30	0	0	30	0	0	30	0	0	30	0	0	30	0	0
30	10	0	30	10	0	30	10	0	30	10	0	30	10	0
31	0	0	31	0	0	31	0	0	31	0	0	31	0	0
31	10	0	31	10	0	31	10	0	31	10	0	31	10	0
32	0	0	32	0	0	32	0	0	32	0	0	32	0	0
32	10	0	32	10	0	32	10	0	32	10	0	32	10	0
33	0	0	33	0	0	33	0	0	33	0	0	33	0	0
33	10	0	33	10	0	33	10	0	33	10	0	33	10	0
34	0	0	34	0	0	34	0	0	34	0	0	34	0	0
34	10	0	34	10	0	34	10	0	34	10	0	34	10	0
35	0	0	35	0	0	35	0	0	35	0	0	35	0	0
35	10	0	35	10	0	35	10	0	35	10	0	35	10	0
36	0	0	36	0	0	36	0	0	36	0	0	36	0	0
36	10	0	36	10	0	36	10	0	36	10	0	36	10	0
37	0	0	37	0	0	37	0	0	37	0	0	37	0	0
37	10	0	37	10	0	37	10	0	37	10	0	37	10	0
38	0	0	38	0	0	38	0	0	38	0	0	38	0	0
38	10	0	38	10	0	38	10	0	38	10	0	38	10	0
39	0	0	39	0	0	39	0	0	39	0	0	39	0	0
39	10	0	39	10	0	39	10	0	39	10	0	39	10	0
40	0	0	40	0	0	40	0	0	40	0	0	40	0	0
40	10	0	40	10	0	40	10	0	40	10	0	40	10	0
41	0	0	41	0	0	41	0	0	41	0	0	41	0	0
41	10	0	41	10	0	41	10	0	41	10	0	41	10	0
42	0	0	42	0	0	42	0	0	42	0	0	42	0	0
42	10	0	42	10	0	42	10	0	42	10	0	42	10	0
43	0	0	43	0	0	43	0	0	43	0	0	43	0	0
43	10	0	43	10	0	43	10	0	43	10	0	43	10	0
44	0	0	44	0	0	44	0	0	44	0	0	44	0	0
44	10	0	44	10	0	44	10	0	44	10	0	44	10	0
45	0	0	45	0	0	45	0	0	45	0	0	45	0	0
45	10	0	45	10	0	45	10	0	45	10	0	45	10	0
46	0	0	46	0	0	46	0	0	46	0	0	46	0	0
46	10	0	46	10	0	46	10	0	46	10	0	46	10	0
47	0	0	47	0	0	47	0	0	47	0	0	47	0	0
47	10	0	47	10	0	47	10	0	47	10	0	47	10	0
48	0	0	48	0	0	48	0	0	48	0	0	48	0	0
48	10	0	48	10	0	48	10	0	48	10	0	48	10	0
49	0	0	49	0	0	49	0	0	49	0	0	49	0	0
49	10	0	49	10	0	49	10	0	49	10	0	49	10	0
50	0	0	50	0	0	50	0	0	50	0	0	50	0	0
50	10	0	50	10	0	50	10	0	50	10	0	50	10	0
51	0	0	51	0	0	51	0	0	51	0	0	51	0	0
51	10	0	51	10	0	51	10	0	51	10	0	51	10	0
52	0	0	52	0	0	52	0	0	52	0	0	52	0	0
52	10	0	52	10	0	52	10	0	52	10	0	52	10	0
53	0	0	53	0	0	53	0	0	53	0	0	53	0	0
53	10	0	53	10	0	53	10	0	53	10	0	53	10	0
54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
54	10	0	54	10	0	54	10	0	54	10	0	54	10	0
55	0	0	55	0	0	55	0	0	55	0	0	55	0	0
55	10	0	55	10	0	55	10	0	55	10	0	55	10	0
56	0	0	56	0	0	56	0	0	56	0	0	56	0	0
56	10	0	56	10	0	56	10	0	56	10	0	56	10	0
57	0	0	57											

To find the Interest,

IN A CURIOUS, SPEEDY, AND MOST INTERESTING MANNER,
OF ANY SUM OF MONEY,

*For any Number of Months, Weeks, or Days, and at any
Rate per Cent.*

BY THE FOREGOING TABLE.

RULE.

Multiply the principal, by the rate per cent., and that product by the number of months, weeks, or days, for which the interest is required, and then cut off two figures on the right side of the product, and collect from the foregoing table the several sums against the different numbers, as when added will make the number remaining, and add the several sums together, which will give the interest required; and

If the interest be for months, add 2d. for every 10 that is cut off.

If the interest be for weeks, add half a penny for every 10 cut off.

If the interest be for days, add one farthing for every 40 cut off.

Examples.

What is the interest for £1357. 10s. for 10 months, at 4 per cent.?

		Interest.		
£.	s.	£.	s.	d.
1357	10	500 = 41 13 4		
	4	40 = 3 6 8		
		3 = 0 5 0		
5430	0			
	10	Ans. £.45 5 0		
543	00			

Here I first look in the foregoing table for £500., and find on the same line in the column for months, £41. 13s. 4d. In the same column, annexed to £40., I find £3. 6s. 8d., and annexed to

£3. I find 5s., which, added together, gives the interest of £543. for 10 months, at 4 per cent., which amounts to £45. 5s., as above, and so of any other sum; and for any time whatever.

What is the interest of £1411. 5s., for eight weeks, at 5 per cent. ?

£.	s.		Interest.
1411	5	principal.	£. s. d.
	5	per cent.	500 = 9 12 3½
			60 = 1 3 0½
			4 = 0 1 6½
			*50 = 0 0 2½
7056	5		
	5	number of weeks.	
564	50	0	Ans. £10 17 1½

* Here, 50 being cut off, as 50 are 5 tens, and the time of interest being for weeks, I had 5 half pence, as per Rule, which make 2½d.

What is the interest of £2011. 10s., for 60 days, at 6 per cent. ?

£.	s.		Interest.
2011	10	principal.	£. s. d.
	6	per cent.	7000 = 19 3 6½
			200 = 0 10 11½
			40 = 0 2 2½
			1 = 0 0 0½
			*40 = 0 0 0½
12069	0		
	60	number of weeks.	
7241	40		Ans. £19 16 9

* Here, 40 being cut off, and the interest being for days, I add ½d., as per Rule.

The following Table is also submitted

AS A

GENERAL INTEREST TABLE,

By which the Interest of any Sum, at any Rate, and for any Time, may also be readily ascertained.

Days.	3 per Cent.			3½ per Cent.			4 per Cent.			4½ per Cent.			5 per Cent.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1	0	0	13	0	0	24	0	0	24	0	0	3	0	0	3½
2	0	0	32	0	0	48	0	0	48	0	0	6	0	0	6½
3	0	0	51	0	0	63	0	0	72	0	0	8½	0	0	9½
4	0	0	74	0	0	84	0	0	102	0	0	11½	0	1	1½
5	0	0	99	0	0	111	0	1	117	0	1	24	0	1	4½
6	0	0	118	0	1	132	0	1	133	0	1	34	0	1	7½
7	0	1	13	0	1	4	0	1	61	0	1	84	0	1	11½
8	0	1	32	0	1	64	0	1	94	0	1	11½	0	2	2½
9	0	1	51	0	1	84	0	1	113	0	2	24	0	2	5½
10	0	1	72	0	1	111	0	2	21	0	2	54	0	2	8½
20	0	3	32	0	3	10	0	4	41	0	4	11½	0	5	5½
30	0	4	11	0	5	9	0	6	63	0	7	44	0	8	2½
40	0	6	64	0	7	8	0	8	94	0	9	10½	0	10	11½
50	0	8	24	0	9	7	0	10	114	0	12	34	0	13	8½
60	0	9	10½	0	11	6	0	13	14	0	14	94	0	16	5½
70	0	11	6	0	13	5	0	15	4	0	17	31	0	19	2
80	0	13	13	0	15	4	0	17	64	0	19	84	1	1	11
90	0	14	94	0	17	3	0	19	84	1	2	24	1	4	7½
100	0	16	54	0	19	2	1	1	10	1	4	84	1	7	4½
200	1	12	104	1	18	44	2	3	112	2	9	34	2	14	9½
300	2	9	34	2	17	64	3	5	93	3	13	114	4	2	2½

DIRECTIONS

FOR USING THE ABOVE TABLE.

CASE I.

To find the interest for any number of days.

RULE.

Look in the first column for the number of days you wish to ascertain the interest for, and on the parallel line in the column, under the rate per cent. required, you will find the amount of interest.

Example.

The interest of £100., for 60 days, at 3 per cent., I find to be 9s. 10½d., by looking for 60 in the first column, observing the sum marked on the parallel line in the column of 3 per cent, and so of any other.

CASE II.

To find the interest for any other time than for days.

RULE.

1. If the interest for £100. be required for a year and days, take the interest for the several days from the table, which add to the interest for a year.

2. If the interest be for several years, multiply the interest for one year, by the number of years for which the amount of interest is required.

3. If the interest be for the aliquot parts of a year, take the aliquot parts of the interest for a year.

N. B. When the interest is required for any other rate per cent. than named in the table, it may be with great facility made out, by those which are mentioned, as $\frac{1}{2}$ of 3 is $1\frac{1}{2}$; $\frac{1}{3}$ of 4 is 2; $\frac{1}{4}$ of 5 is $1\frac{1}{4}$; or by adding or subtracting, as for 8 per cent. double the interest at 4 per cent. for 7 per cent. double the interest at $3\frac{1}{2}$ per cent., and so of any other

Examples.

What is the interest of £100. for a year and 160 days, at $3\frac{1}{2}$ per cent. per annum?

The interest for a year is	...	...	...	...	£.3	10	0
In the column for $3\frac{1}{2}$ per cent., parallel with	}					0	19
the line on which 100 days is marked, I find							
In the same column, for 60 days, I find	...	...	...	...	...	0	11

And, added together, find the interest for the	}					£.5	0
whole time to be							

**A NEW AND PARTICULARLY INGENIOUS PLAN,
Whereby the Day of the Month may be instantly ascertained till (next Century) the Year of our
Lord 1900, and the Day of the Week in which any Day of the Month may fall in any Year;
instantly found, BY THE FOLLOWING COLUMNS.**

N. B. The Table of Years is dated back as far as 1818, to accommodate persons who wish to ascertain what Day of the Week any Day of the Month in a former year fell.

TABLE

OF

YEARS.

*From 1818 to 1849,
inclusive.*

18. 29. 35. 46.
19. 30. 41. 47.
25. 31. 42. —
22. 33. 39. —
23. 34. 45. —
26. 37. 43. —
21. 27. 38. 49.

Table of Leap Years.

52. 60. 88.
36. 64. 92.
40. 68. 96.
44. 72. 100.

COLUMNS OF MONTHS.

JAN. 31	FEB. 28	MARCH 31	APRIL, 30	MAY, 31	JUNE, 30	JULY, 31	AUG. 31	SEPT. 30	OCT. 31	NOV. 30	DEC. 31
5 6 7 3 4 1 2	1 2 3 6 7 4 5	1 2 3 6 7 4 5	4 5 6 2 3 7 1	6 7 1 4 5 2 3	2 3 4 7 1 5 6	4 5 6 2 3 7 1	7 1 2 5 6 3 4	3 4 5 1 2 6 7	5 6 7 3 4 1 2	1 2 3 6 7 4 5	3 4 5 1 2 6 7
XXXI.	XXIX.	XXXI.	XXX.	XXX.	XXX.	XXX.	XXX.	XXX.	XXX.	XXX.	XXXI.

TABLE

OF

YEARS.

*From 1850 to 1899,
inclusive.*

57. 63. 74. 35. 91.
58. 69. 75. 86. 97.
53. 59. 70. 81. 87. 98.
50. 61. 67. 78. 89. 95.
51. 62. 73. 79. 90. —
54. 65. 71. 82. 93. 99.
55. 66. 77. 83. 94. —

TABLE

To find the Month's Age.

Numbers of the

Months.

1855....11
1856....12
1857....1
1858....2
1859....3
1860....4
1861....5
1862....6
1863....7
1864....8
1865....9
1866....10
1867....11
1868....12
1869....1
1870....2
1871....3
1872....4
1873....5
1874....6
1875....7
1876....8
1877....9
1878....10
1879....11
1880....12
1881....1
1882....2
1883....3
1884....4
1885....5
1886....6
1887....7
1888....8
1889....9
1890....10
1891....11
1892....12
1893....1
1894....2
1895....3
1896....4
1897....5
1898....6
1899....7

TABLE OF DATES OF THE MONTH.		COLUMNS OF WEEKS.							TABLE OF DATES OF THE MONTH.	
1		2	3	4	5	6	7			
29. SUNDAY	MONDAY	TUESDAY	WEDNES.	THURS.	FRIDAY	SATUR.	1. 8. 15. 22. 29.			
30. MONDAY	TUESDAY	WEDNES.	THURS.	FRIDAY	SATUR.	SUNDAY	2. 9. 16. 23. 30.			
31. TUESDAY	WEDNES.	THURS.	FRIDAY	SATUR.	SUNDAY	MONDAY	3. 10. 17. 24. 31.			
1. WEDNES.	THURS.	FRIDAY	SATUR.	SUNDAY	MONDAY	TUESDAY	4. 11. 18. 25.			
2. THURS.	FRIDAY	SATUR.	SUNDAY	MONDAY	TUESDAY	WEDNES.	5. 12. 19. 26.			
3. FRIDAY	SATUR.	SUNDAY	MONDAY	TUESDAY	WEDNES.	THURS.	6. 13. 20. 27.			
4. SATUR.	SUNDAY	MONDAY	TUESDAY	WEDNES.	THURS.	FRIDAY	7. 14. 21. 28.			

DIRECTIONS FOR FINDING THE DAY OF THE MONTH BY THE ABOVE COLUMNS.

If it were required to find the 1st. of January, 1825, I look in the Table of Years for 25, then observe what figure stands under January, in the column of Months, on the same line with 25, which I perceive is 7; I then look for the figure 7 in the columns of Weeks, the first day of which is Saturday, and thereby ascertain that the 1st. of January 1825, fell on a Saturday; and by observing the lateral columns, I have the Date for the whole Month; and so of every other Month in any Year. As Saturday was the 1st. of January, I perceive the figures for every other Day of the Month in due order, and not only find Sunday to be the 2nd., Monday the 3rd., and so on; but if I wish to ascertain the Day of the Month for any other Day in a future Week, it is done without any further trouble than glancing at the figures parallel with the Day on which the Day of the Month is required; for example, the Day of the Week for next Wednesday three weeks, (supposing this to be the 1st. of Jan. 1825,) I find by the third row of figures parallel to Wednesday, to be the 19th.; next Sunday four weeks I find by the fourth row of figures parallel to Sunday, to be the 23rd., and so of any other Day, in any Year, till next century.

N. B. At the first glance of this plan, it may perhaps appear too tedious to be generally pursued, ten minutes perusal thereof will, however, completely obviate every supposed difficulty, and the Day of the Month ever after, will be found hereby, in half the time usually occupied in turning over the pages of an Almanac, and in every respect prove far superior thereto.

TO FIND
THE MOON'S AGE.

RULE.

1. To find the Moon's Age, look in the Tables prepared for finding the Moon's Age, page 60, and add the number that stands against the given Year and Month together, to which also add the Day of the Month on which the Moon's Age is required; and what their sum make over or under 30, will be her Age, in months containing 31 days; but the excess above 29, will shew her age in months containing only 30 days.

2. To find when there will be a New Moon, subtract the Age of the Moon from 30, for months containing 31 days, and from 29 for months containing 30 days, and the remainder will be the day of the next new moon.

Examples.

1. If the moon's age be required for July 1, 1825, I look in the column of years for 1825, page 60, and find the epact for that year to be 11, and the number for the month of July, 3, which together, make 14, and added to 1, for the day of the month, make 15, and thereby ascertain that the age of the moon on July 1st, 1825, will be 15 days.

2. What will be the age of the moon on the 29th of August, 1825?

11 the epact for 1825.

6 the number for Aug.

29 the day of the month.

from 45

take 30

Ans. 15 days old.

3. What will be the age of the moon on the 20th of September, 1825?

11 the epact for 1825.

6 the number for Sept.

20 the day of the month.

from 37

take 29

Ans. 8 days old.

In the 2nd. example I subtract 30, as per Rule above, because in August there are 31 days.

In the 3rd. example I subtract only 29, as per Rule, because in September there are but 30 days.

4. What will be the age of the moon on February 1st, 1830?

6 the epact for 1830.

1 the number for Feb.

1 the day of the month.

Ans. 8 days old.

5. What will be the age of the moon on July 5th, 1835?

1 the epact for 1835.

3 the number for July.

5 the day of the month.

Ans. 9 days old.

In these examples the answers are obtained *merely* by adding the epact for the year, and the number for the month to the day of the month. 8 being less than 29, and 9 being less than 30, of course 29 and 30 cannot be subtracted therefrom.

6. When will there be a new moon, this being June, and the age of the moon being 18 days?

from 29

take 18 days.

Ans. in 11 days.

7. When will there be a new moon, this being August, and the present age of the moon being 22 days.

from 30

take 22 days.

Ans. in 8 days.

A TABLE

TO FIND THE HOUR OF THE

MOON'S RISING AND SETTING,

AT ALL TIMES.

At 4 days old it sets at, and shines till about 10 at night.

5 about 11

6 about 12

7 nearly 1 morning,

At 15 days old it rises about 6 in the evening

16 at $\frac{1}{4}$ past 7

17 at $\frac{1}{2}$ past 8

18 about 10

19 about 11

20 about 12

N. B. This Table is sufficiently accurate for ASCERTAINING MOONLIGHT EVENINGS, AT ALL TIME

TO FIND WHEN

EASTER* DAY WILL HAPPEN,

FOR ANY YEAR.

RULE.

Find on what day of March the New Moon falls nearest to the 21st. in common years, and nearest to the 20th. in leap years, as per Rule, page 62; then the Sunday next after the full or 15th day of that New Moon, will be Easter Day.

Examples.

On what day will Easter fall next year, 1826?

By the 2nd. part of Rule, page 62, I find there will be a new moon on the 8th of March, to which I add 15, for the full of the moon, which make 23, and as I perceive by the column of years, page 60, that the 23rd. of March, 1826, will fall on a Thursday, I ascertain that Sunday the 26th. of March will be Easter Sunday, that being the first Sunday after the full of the moon nearest to the 21st. of March.

N. B. Whitsuntide, and the other moveable feasts, are always governed by the time on which Easter Day may fall. Thus Ascension-Day is always 40 days *after* Easter, and Whitsuntide seven weeks after Easter, and Trinity Sunday eight weeks after Easter, and so of the moveable feasts *before* Easter; thus Quinquagesima Sunday is always six weeks before Easter, Quinquagesima Sunday seven weeks before Easter, and so of each other moveable feast.

* Easter is so called from *Eastra*, the name of the Saxon deity, the celebration of whose grand festival was about the same time of the year which is celebrated by Christians on the resurrection of Christ.

TO FIND

THE YEAR OF THE CYCLE* OF THE MOON,

WHICH IS FREQUENTLY CALLED THE LUNAR CYCLE, AND
GOLDEN NUMBER.†

RULE.

Add 1 to the given year, which sum divide by 19, and the remainder will be the number sought; if none remains, the moon is in the 19th year of her cycle.

Examples.

1. Find the year of the lunar cycle, or golden number, for the year 1827.

$$\begin{array}{r} 1827 \\ 1 \\ \hline 19)1828(96 \\ 171 \\ \hline 118 \\ 114 \\ \hline \end{array}$$

Ans. 4 golden number.

The Christian epoch having commenced with the birth of Christ, and the epoch of the moon's cycle being one year before his birth, is the cause of adding 1, to the given year; and we divide by 19, because 19 years is the period of the cycle of the moon.

* The word Cycle signifies a ring, or circle, and is the space of time in which the same revolution begins again; a cycle of the moon is a period of 19 years, after which space the new and full moon's return are on the same days of the month as before, excepting 1 hour and 28 minutes sooner, and is called the *Lunar Cycle*, from the Latin word *Lunaris*, which relates to the moon.

† It is called the *Golden Number*, because in the ancient calendars they were written in letters of gold, as an indication of their excellent use, and to shew their esteemed value. By these numbers we discover the age of the moon, and determine the time of Easter, and other moveable feasts, as before explained, pages 60 and 64.

2. What was the year of the cycle of the moon for the year of our Lord 1823?

$$\begin{array}{r}
 1823 \\
 \underline{1} \\
 19)1824(96 \\
 \underline{171} \\
 114 \\
 \underline{114} \\
 \dots
 \end{array}$$

There being no remainder to this operation, I perceive the moon to be in the 19th. year of her cycle, and consequently will have completed her revolution this year.

N. B. The Author has given a Table of the Epact for 12 years, in the column to find the Moon's Age, page 60 ; there will therefore be no absolute necessity for perusing the following Rules for finding the Golden Number, or Epact, till the expiration of that time, nevertheless they will be particularly interesting to the studious.*

TO FIND

THE EPACT,†

OR THE EXCESS OF THE SOLAR YEAR ABOVE THE LUNAR,
TILL THE YEAR 1900.

Subtract *one* from the Golden Number, and multiply its remainder by 11, which product, if under 30, will be the Epact, but if above 30, divide the said product by 30, and that remainder will be the Epact.

* Any person may lengthen the table referred to in the above note, and laid down in page 60, by adding 11 to the last epact, which will then be the epact for the year following, and continuing to add 11 for every succeeding year during the present cycle of the moon, remembering when the number is above 30, to divide by 30, and take the remainder only for the epact. The present cycle commenced with the year 1824, and the moon will consequently be in the last year of her present cycle in the year 1842, and recommence her revolution with the year 1843.

† Epact signifies a supplement, and is the number of days added to the lunar year, which makes it equal to the solar year, the solar year having 365 days, and nearly 6 hours, whereas the lunar year has but 354 days, and a little upwards of 8 hours, which is nearly 11 days difference.

N. B. When the solar and lunar cycles begin together, the moon's age on the first of each month, or the monthly epacts, are called the numbers of the months which may be seen (for the present cycle of the moon, a term of 19 years), annexed to each month in the table to find the moon's age, page 60.

Examples.

1. What is the epact for the year 1827?

By the last example I find 4 to be the golden number, from which I take 1, and consequently 3 remains; this 3 I multiply by 11, which make 33, and then divide the 33 by 30, and the 3 which remains is the epact for the year 1827.

2. What is the epact for next year, (1826)?

$$\begin{array}{r}
 1826 \\
 1 \\
 19 \overline{)1827(96} \\
 \underline{171} \\
 117 \\
 \underline{114} \\
 3 \text{ golden number.} \\
 \underline{1} \\
 2 \\
 \underline{11}
 \end{array}$$

Ans. 23 epact.

The 23 not being so many as 30, I consequently cannot divide by 30, the 23 will therefore be the epact for 1826. I subtract 1 from the golden number, in consideration of having added 1, to find the golden number, and multiply by 11, (that number being so near the difference in number of days between the solar and lunar years).

TO FIND

BISSEXTILE, OR LEAP YEAR.*

Divide the given year by 4; if nothing remains, it is Leap Year, but if 1, 2, or 3, remains, it is so many years after Leap Year.

* This year is called the Bissextile Year, from the Latin word *bis*, which signifies twice, and *sextillis*, belonging to the sixth, and because the Romans used to reckon the 24th day of February twice over, which fell on the sixth day of the calends, or first day of March; and as they reckoned backwards from the first of March, the sixth day fell on February 24th. It is called Leap Year, instead of Bissextile, because in common years the fixed day of any month changes successively the day of the week, but in this year it leaps over a day.







